SOIL SURVEY OF

Abbeville County, South Carolina

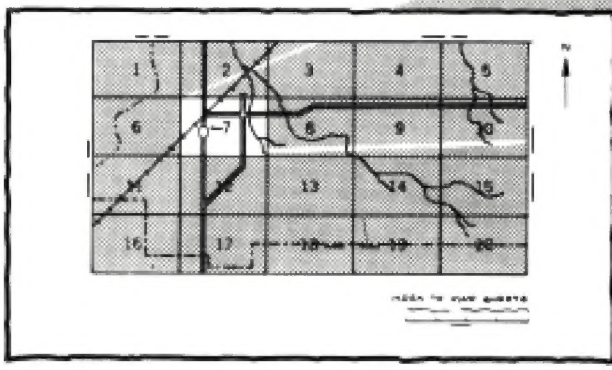
United States Department of Agriculture
Soil Conservation Service and Forest Service

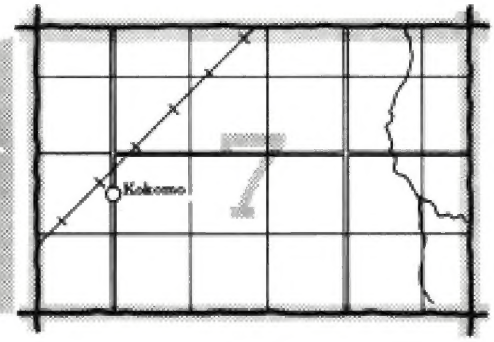
in cooperation with the

South Carolina Agricultural Experiment Station
and the South Carolina
Land Resources Conservation Commission

HOW TO USE

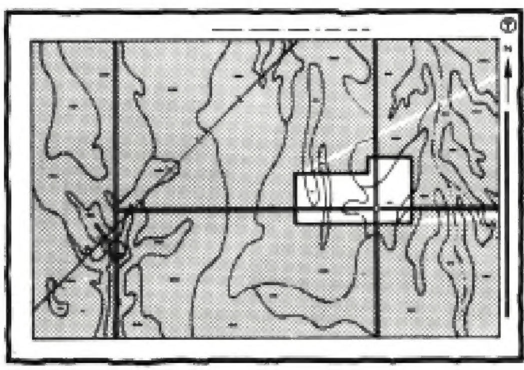
1. Locate your area of interest on the "Index to Map Sheets"

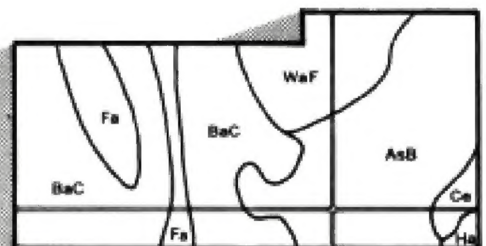




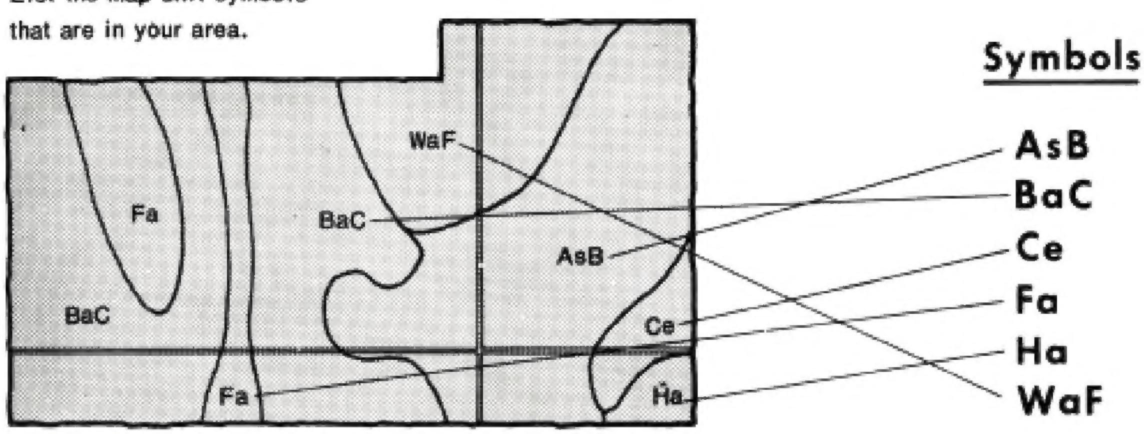
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



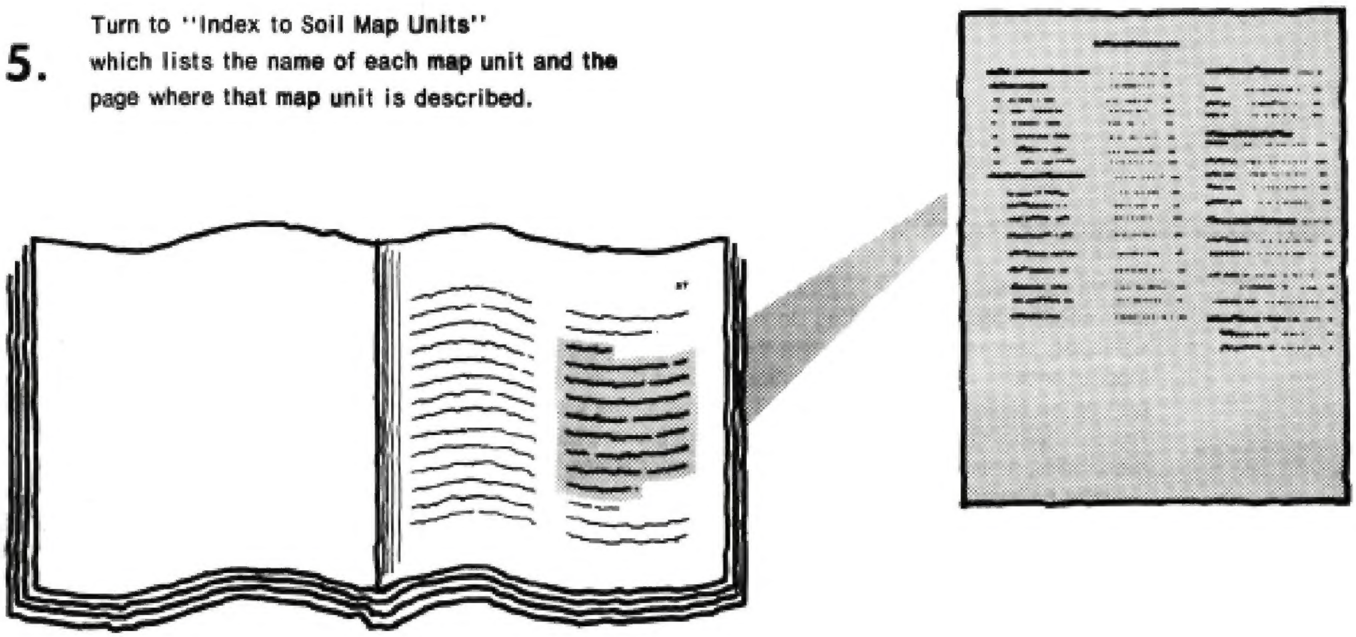


4. List the map unit symbols that are in your area.

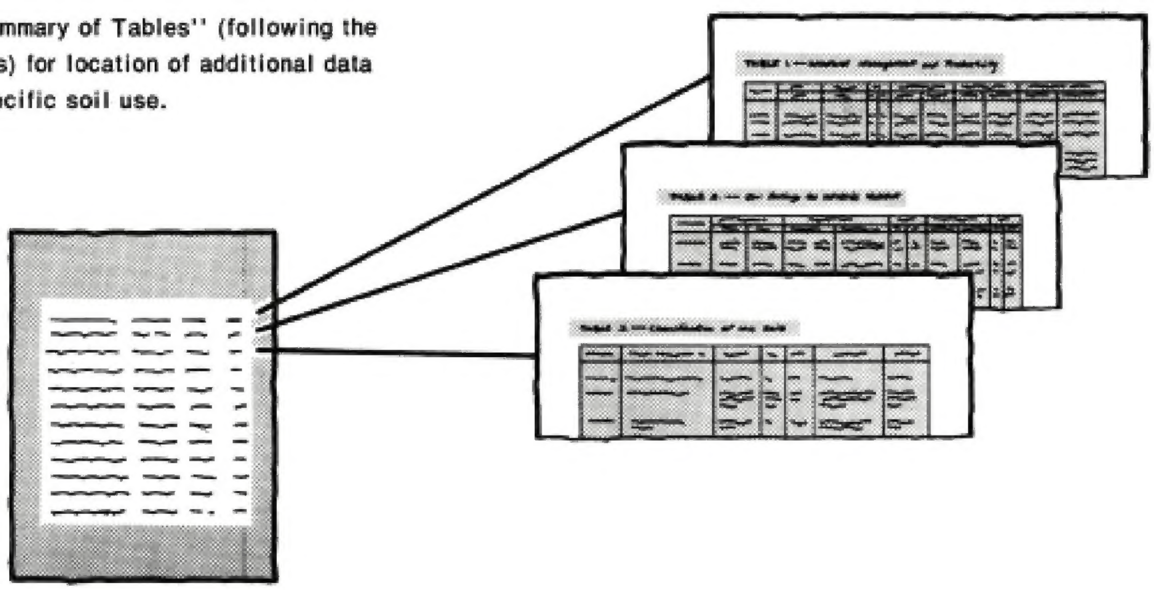


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1970-75. Soil names and descriptions were approved in 1976. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1976. This survey was made cooperatively by the Soil Conservation Service, the Forest Service, the South Carolina Agricultural Experiment Station, and the South Carolina Land Resources Conservation Commission. It is part of the technical assistance furnished to the Abbeville Soil and Water Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps can cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

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Issued April 1980

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Foreword

The Soil Survey of Abbeville County, South Carolina, contains much information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

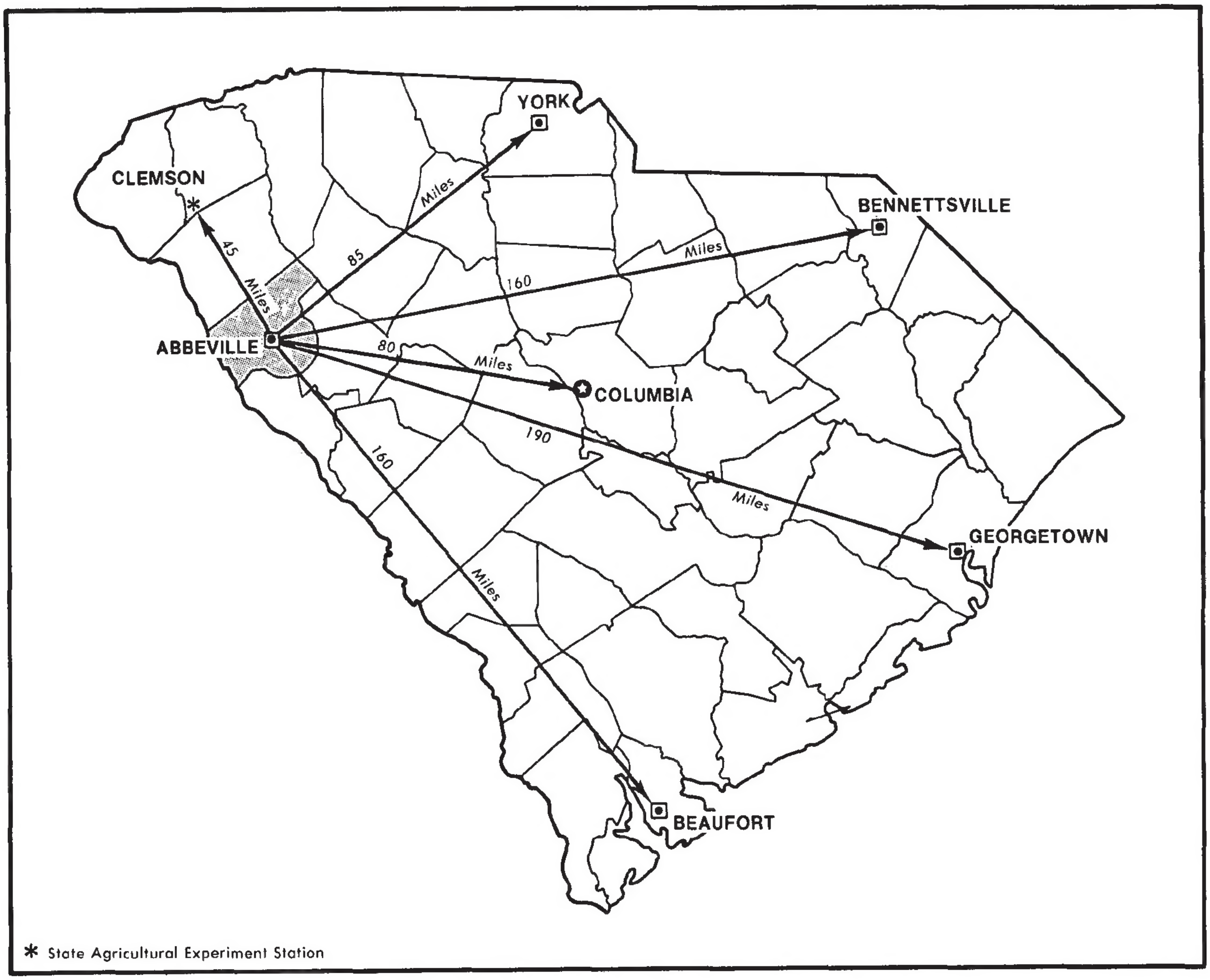
This soil survey has been prepared for many different users. Farmers, ranchers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and homebuyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the soil survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

This soil survey can be useful in the conservation, development, and productive use of soil, water, and other resources.

George E. Huey
State Conservationist
Soil Conservation Service



Location of Abbeville County in South Carolina.

SOIL SURVEY OF ABBEVILLE COUNTY, SOUTH CAROLINA

By Edward C. Herren, Soil Conservation Service

Soils surveyed by H. S. Byrd, R. W. Craft, and E. C. Herren,
Soil Conservation Service;
W. J. Camp and W. H. Fleming, South Carolina Land Resources Conservation Commission;
and L. E. Andrew, Forest Service

United States Department of Agriculture, Soil Conservation Service
and Forest Service, in cooperation with the
South Carolina Agricultural Experiment Station and the
South Carolina Land Resources Conservation Commission

ABBEVILLE COUNTY is in the western part of South Carolina (see map on facing page). The Savannah River forms its southwestern boundary and separates it from the State of Georgia. The Saluda River, which forms part of the northeastern boundary, separates Abbeville County from Laurens County. Abbeville County is bounded on the northwest by Anderson County, on the southeast by Greenwood County, and on the south by McCormick County. Abbeville, the county seat, is in the southeastern part of the county and has a population of 5,515. The county has a population of 21,112. Total land area is about 506 square miles, or about 324,000 acres.

The county is on the Piedmont Plateau of western South Carolina. Elevation ranges from 340 feet on the Savannah River at the Abbeville-McCormick County line to 832 feet at the top of Parson Mountain. Most of the acreage is gently sloping or sloping, but most areas near streams and drainageways are moderately steep to steep. The soils on flood plains of rivers and small streams are nearly level and are subject to frequent flooding.

General nature of the county

In the paragraphs that follow, the county is described in terms of its settlement, natural resources, farming, and climate.

Settlement

Before permanent settlers came to what is now Abbeville County, the Cherokee Indians lived in the area. There were Indian trails throughout the county; one of the better known was the Black Bear Trail, which traversed the high grounds between Long Cane Creek and Little River. For centuries the Cherokees used this trail and the reliable spring nearby.

The first settlers came to Abbeville County in the mid 1700's. By the end of 1757, about 30 families lived in the area. In 1764 about 200 French Huguenots moved in. One of the Huguenots named the community of Abbeville for Abbe Ville, a medieval French town famous for its churches and shrines.

In 1774 the governor obtained title from the Cherokee Indians for the area that is now Oconee, Pickens, Anderson, Abbeville, Edgefield, Laurens, Union, York, Spartanburg, Greenville, Newberry, Chester, Fairfield, and Richland Counties. This area was known as the Ninety-Six District. It was quickly settled.

As the number of settlers increased, the huge district became too cumbersome; another division became necessary. In 1785, the district was divided into counties. Abbeville County, established in 1793 and organized in 1798, originally had an area of about 1,000 square miles. Nearly half of this area was taken in 1897 to form Greenwood County, and in 1917 a smaller area was taken to form McCormick County.

Natural resources

Soil is the most important resource in the county. Livestock and crops are marketable products derived from the soil.

The county also has an abundant supply of water for domestic and livestock use. Most drainageways have running water. Lake Secession and the many hundreds of farm ponds throughout the county can provide an abundant supply of water for future needs.

About 194,000 acres of the county is wooded.

Farming

The first settlers grew corn, oats, rye, wheat, hemp, grapes, sweet potatoes, and other crops and raised hogs, beef cattle, sheep, and horses. Indigo, tobacco, flax, and cotton were grown later.

During the 1850's, the best acreages were used for cotton and 350,000 bushels of corn was imported. Abbeville farmers formed the Abbeville District Agricultural Society in 1859 to advocate the planting of clover, corn, oats, barley, and peas. By 1876, the area was exporting feed grains (*3*).

After the cottongin was invented and railroads reached the county, cotton became the money crop. Forests were

cleared, and the land was planted to cotton. Because the soils were not protected, erosion became a serious concern. In response, the farmers of Abbeville County organized the Abbeville Soil and Water Conservation District under the South Carolina Soil Conservation District Law of 1937. The Soil Conservation Service is now providing technical assistance to the farmers in the county.

About 36 percent of the acreage of the county is in individual farms. Most of the soils have a loamy plow layer, and a large acreage is suitable for cotton, corn, grain sorghum, soybeans, pasture, and other crops. The soils most used for cultivated crops are Appling, Cecil, Durham, Hiwassee, and Cataula soils. These soils are well drained but are susceptible to erosion. In many areas they are protected by grassed waterways and terraces and by other means. Pasture or woodland is a good use on many of the more sloping soils. About 27 percent of the county is cropland and pasture; 60 percent is woodland; and 13 percent is urban and in related uses *(6)*. Most farm income is derived from the sale of livestock and livestock products.

The present economy is favorable because of the productivity of the soils in Abbeville County, the good supply of water and trees, and the location of the county near the Blue Ridge Mountains.

Climate

Climatic data in this section were specially prepared for the Soil Conservation Service by the National Climatic Center, Asheville, North Carolina.

Summer in Abbeville County is hot and generally humid. Winter is moderately cold but short because the mountains to the west protect the county against many cold waves. Precipitation is evenly distributed throughout the year and is adequate for all crops.

Table 1 gives data on temperature and precipitation for the survey area, as recorded at Calhoun Falls, South Carolina, for the period 1951 to 1974. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 44 degrees F, and the average daily minimum is 32 degrees. The lowest temperature on record, which occurred at Calhoun Falls on January 30, 1966, is 0 degrees. In summer the average temperature is 78 degrees, and the average daily maximum is 90 degrees. The highest recorded temperature, which occurred on July 30, 1952, is 106 degrees.

Growing degree days, shown in table 1, are equivalent to "heat units." Beginning in spring, growing degree days accumulate by the amount the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 24 inches, or 51 percent, usually falls in April through September, which includes the growing season for most crops. Two years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 4.90 inches at Calhoun Falls on October 30, 1970. There are about 51 thunderstorms each year, 30 of which occur in summer.

Average seasonal snowfall is 2 inches. The greatest snow depth at any one time during the period of record was 8 inches. On the average, 1 day has at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night in all seasons, and the average at dawn is about 90 percent. The percentage of possible sunshine is 60 in summer and 50 in winter. Prevailing winds are northwesterly. Average windspeed is highest, 9 miles per hour, in February.

In winter every few years heavy snow covers the ground for a few days to a week. Every few years in late summer or in autumn, a tropical storm moving inland from the Atlantic Ocean causes extremely heavy rain for 1 to 3 days.

How this survey was made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has been changed very little by leaching or by the action of plant roots.

The soil scientists recorded the characteristics of the profiles they studied, and they compared those profiles with others in counties nearby and in places more distant. Thus, through correlation, they classified and named the soils according to nationwide, uniform procedures.

After a guide for classifying and naming the soils was worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, roads, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called soil map units. Some map units are made up of one kind of soil, others are made up of two or more kinds of soil, and a few have little or no soil material at all. Map units are discussed in

the sections "General soil map for broad land use planning" and "Soil maps for detailed planning."

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. The soils are field tested, and interpretations of their behavior are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from State and local specialists. For example, data on crop yields under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily available to different groups of users, among them farmers, managers of rangeland and woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation.

General soil map for broad land use planning

The general soil map at the back of this publication shows, in color, map units that have a distinct pattern of soils and of relief and drainage. Each map unit is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map provides a broad perspective of the soils and landscapes in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. Areas that are, for the most part, suited to certain kinds of farming or to other land uses can be identified on the map. Likewise, areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of its small scale, the map does not show the kind of soil at a specific site. Thus, it is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The kinds of soil in any one map unit differ from place to place in slope, depth, stoniness, drainage, or other characteristics that affect their management.

The soils in the survey area vary widely in their potential for major land uses. Table 4 shows the extent of the map units shown on the general soil map and gives general ratings of the potential of each, in relation to the other map units, for major land uses. Soil properties that pose limitations to the use are indicated. The ratings of soil potential are based on the assumption that practices in common use in the survey area are being used to overcome soil limitations. These ratings reflect the ease of overcoming the soil limitations and the probability of soil problems persisting after such practices are used.

Each map unit is rated for *cultivated crops, pasture, woodland, urban uses,* and *recreation areas.* Cultivated crops are those grown extensively by farmers in the survey area. Pasture refers to land on which livestock graze. Woodland refers to land that is producing either trees native to the area or introduced species. Urban uses include residential, commercial, and industrial developments. Recreation areas include campsites, picnic areas, ballfields, and other areas that are subject to heavy foot traffic.

1. Toccoa-Chewacla

Deep, nearly level, well drained to somewhat poorly drained soils that are loamy throughout

Areas of these soils are throughout the county. They are on flood plains along the major streams and their tributaries.

This unit makes up about 6 percent of the county. About 62 percent of the unit is Toccoa soils, 35 percent is Chewacla soils, and the remaining 3 percent is minor soils.

Toccoa soils are slightly higher in elevation than Chewacla soils. Toccoa soils are well drained, and Chewacla soils are somewhat poorly drained. Both soils have a seasonal high water table at a depth of less than 5 feet. Toccoa soils have a surface layer of sandy loam, and Chewacla soils have a surface layer of loam.

The minor soils in this unit are the excessively drained Buncombe soils.

This unit is used mainly as woodland and pasture, but some areas are used for cultivated crops. About half of the acreage is in woodland. Some areas cleared of trees have been drained, but some swampy, undrained areas remain. Flooding is the main limitation to the use of these soils for cultivated crops and for most other purposes.

This unit, where adequately drained and partially protected from flooding, has high potential for cultivated crops. Complete protection from flooding, however, is so difficult to achieve that potential for recreation areas and urban uses is low. Potential for cultivated crops, pasture, woodland, and woodland wildlife habitat is high.

2. Pacolet-Wilkes

Moderately deep to shallow, sloping to steep, well drained soils that have a loamy surface layer and a clayey subsoil and are underlain by decomposed bedrock

Areas of these soils are throughout the county. They are adjacent to the bottom land along the Savannah, Rocky, Saluda, and Little Rivers and their tributaries and near the breaks of Calhoun, Hilburn, White's, Long Cane, and Turkey Creeks and their tributaries.

This unit makes up about 26 percent of the county. About 61 percent of the unit is Pacolet soils, 13 percent is Wilkes soils, and the remaining 26 percent is minor soils.

Pacolet and Wilkes soils occur at about the same elevation. They have a surface layer of sandy loam and a subsoil of clay. Pacolet soils have a red subsoil, and Wilkes soils have a brown subsoil. Wilkes soils have a thinner, more plastic subsoil than Pacolet soils.

The minor soils in this unit are the well drained Cecil, Enon, Hiwassee, and Toccoa soils and the somewhat poorly drained Chewacla soils.

This unit is used mainly as woodland, but some tracts are used for pasture. Steep slopes are the main limitation to the use of these soils for cultivated crops and for most other purposes.

The steep slopes are such a severe limitation and are so difficult to overcome that potential for cultivated crops, pasture, and urban uses is low. Potential for woodland, woodland wildlife habitat, and recreation areas is medium.

3. Cecil-Cataula-Hiwassee

Deep, gently sloping to strongly sloping, well drained soils that have a loamy surface layer and a clayey subsoil

Areas of these soils are throughout the eastern and northwestern parts of the county. They are on broad ridges that are dissected by long, shallow, well developed drainageways.

This unit makes up about 37 percent of the county. About 54 percent of the unit is Cecil soils, 20 percent is Cataula soils, 16 percent is Hiwassee soils, and the remaining 10 percent is minor soils.

Cecil and Hiwassee soils in most places are slightly higher in elevation than Cataula soils. All three soils have a surface layer of sandy loam and subsoil of clay. Cecil soils have a red subsoil, Hiwassee soils have a dark red subsoil, and Cataula soils have a red subsoil in most places. In some places, however, Cataula soils have a yellowish red or brown subsoil. Cataula soils have a fragipan at a depth of about 15 to 36 inches.

The minor soils in this unit are the well drained Appling, Enon, Durham, Madison, Mecklenburg, and Pacolet soils; the moderately well drained to somewhat poorly drained Iredell soils; the somewhat poorly drained Chewacla soils; and the moderately well drained Helena soils.

This unit is used mainly for pasture, cultivated crops, and urban uses. Most of the acreage has been cleared, but some areas are wooded. Erosion and slope are the main limitations to the use of these soils for cultivated crops and for most other uses. The slow permeability of the Cataula soils is a severe limitation for septic tank absorption fields; this limitation is very difficult to overcome.

This association has medium potential for cultivated crops and high potential for pasture, urban uses, woodland, woodland wildlife habitat, and recreation areas.

4. Cecil-Cataula-Appling

Deep, gently sloping to sloping, well drained soils that have a loamy surface layer and a clayey subsoil

Areas of these soils are in the northeastern and northwestern parts of the county. They are on broad ridges that are dissected by a few long, shallow drainageways.

This unit makes up about 14 percent of the county. About 43 percent of the unit is Cecil soils, 27 percent is Cataula soils, 24 percent is Appling soils, and the remaining 6 percent is minor soils.

Cecil soils in most places are slightly higher in elevation than Appling and Cataula soils. All have a surface layer of sandy loam and a subsoil of clay. Cecil soils have a red subsoil, Appling soils have a yellowish red to brown subsoil, and Cataula soils have a red subsoil in most places. In some places, however, Cataula soils have a yellowish red or brown subsoil. Cataula soils have a fragipan at a depth of about 15 to 36 inches.

The minor soils in this unit are the well drained Durham, Hiwassee, and Madison soils and the moderately well drained Helena soils.

This unit is used mainly for cultivated crops and pasture. Most of the acreage has been cleared, but some areas are wooded. Erosion and slope are the main limitations to the use of these soils for cultivated crops and for most other uses. The slow permeability of the Cataula soils is a severe limitation for septic tank absorption fields and is very difficult to overcome.

This unit has medium potential for cultivated crops and high potential for pasture, urban uses, woodland, woodland wildlife habitat, and recreation areas.

5. Mecklenburg-Davidson-Iredell

Deep to moderately deep, gently sloping to strongly sloping, well drained to somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil and are underlain by decomposed bedrock

Areas of these soils are in the southwestern part of the county. They are on broad ridges that are dissected by few long, shallow, well developed drainageways.

This unit makes up about 9 percent of the county. About 40 percent of the unit is Mecklenburg soils, 27 percent is Davidson soils, 17 percent is Iredell soils, and the remaining 16 percent is minor soils.

Mecklenburg and Davidson soils are slightly higher in elevation than Iredell soils. All have a surface layer of sandy loam and a subsoil of clay. Mecklenburg soils have a red to yellowish red, plastic subsoil; Iredell soils have a yellowish brown to olive brown, very plastic subsoil; and Davidson soils have a thick, dark red subsoil.

The minor soils in this unit are the well drained Cataula, Cecil, Enon, Hiwassee, Pacolet, Toccoa, and Wilkes soils and the somewhat poorly drained Chewacla soils.

This unit is used mainly for cultivated crops and pasture. Most of the acreage has been cleared, but some areas are wooded. Erosion hazard, slope, and slow permeability are the main limitations to the use of these soils for cultivated crops and for most other uses. The slow permeability of the Mecklenburg and Iredell soils is a severe limitation for septic tank absorption fields; this limitation is very difficult to overcome.

This unit has medium potential for recreation areas and cultivated crops; high potential for pasture, woodland, and woodland wildlife habitat; and low potential for urban uses.

6. Cecil-Hiwassee-Mecklenburg

Deep to moderately deep, gently sloping to strongly sloping, well drained soils that have a loamy surface layer and a clayey subsoil and are underlain by decomposed bedrock

Areas of these soils are in the west-central and south-central parts of the county. They are on broad ridges that are dissected by few long, shallow, well developed drainageways.

This unit makes up about 8 percent of the county. About 40 percent of the unit is Cecil soils, 25 percent is Hiwassee soils, 20 percent is Mecklenburg soils, and the remaining 15 percent is minor soils.

Cecil and Hiwassee soils in most places are slightly higher in elevation than Mecklenburg soils. All have a surface layer of sandy loam and a subsoil of clay. Cecil soils have a red subsoil; Hiwassee soils have a dark red subsoil; and Mecklenburg soils have a red to yellowish red, plastic subsoil.

The minor soils in this unit are the well drained Cataula, Enon, Pacolet, Toccoa, and Wilkes soils and the somewhat poorly drained Chewacla soils.

This unit is used mainly as woodland and pasture. Erosion hazard and slope are the main limitations to the use of these soils for cultivated crops and for most other uses. The slow permeability of the Mecklenburg soils is a severe limitation for septic tank absorption fields; this limitation is very difficult to overcome.

This unit has medium potential for cultivated crops and high potential for woodland, pasture, urban uses, woodland wildlife habitat, and recreation areas.

Broad land use considerations

Each year a considerable amount of land is being developed for urban uses in Abbeville, Due West, and other towns in the county. The general soil map is most helpful for planning the general outline of urban areas; it cannot be used for the selection of sites for specific urban structures. In general, in the survey area the soils that have high potential for cultivated crops also have high potential for urban development. The data about specific soils in this survey can be helpful in planning future land use patterns.

Areas where the soils are so unfavorable that urban development is prohibitive are not extensive in the survey area. The Toccoa-Chewacla unit is on flood plains on which flooding and wetness are severe limitations. In large areas of the Pacolet-Wilkes unit, slope is a severe limitation for urban development and is a very costly limitation to overcome. The clayey soils of the Mecklenburg-Davidson-Iredell unit have low potential for urban development because of shrink-swell potential, slow permeability, and low strength.

Large areas of the county can be used for urban development at lower costs than can the areas named above. These include parts of the Mecklenburg-Davidson-Iredell unit and less sloping parts of the Pacolet-Wilkes unit. The Cecil-Cataula-Hiwassee and Cecil-Cataula-Appling units can be used for urban development except where they are subject to flooding; these units have high or medium potential for crops and pasture, and this potential should not be overlooked when broad land uses are considered.

The Mecklenburg-Davidson-Iredell unit has high or medium potential for crops and pasture but medium or low potential for nonfarm uses. The clayey subsoil has slow or moderate permeability, low strength, and moderate to high shrink-swell potential; these are limitations to nonfarm uses of these soils.

Most of the soils of the county have high or medium potential as woodland.

Some good sites for parks and recreational areas exist in the Pacolet-Wilkes unit. Hardwood forests enhance the beauty of most of this unit.

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each map unit, or soil, is given in the section "Use and management of the soils."

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated, and the management concerns and practices needed are discussed.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map are phases of soil series.

Soils that have a profile that is almost alike make up a *soil series.* Except for allowable differences in texture of

the surface layer or of the underlying substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped.

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristics that affect their use. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Cecil sandy loam, 2 to 6 percent slopes, is one of several phases within the Cecil series.

Most map units include small, scattered areas of soils other than those that appear in the name of the map unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the map unit. These soils are described in the description of each map unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

The acreage and proportionate extent of each map unit are given in table 5, and additional information on properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of tables.") Many of the terms used in describing soils are defined in the Glossary.

ApB—Appling sandy loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on broad ridgetops of uplands of the Piedmont. Slopes are smooth and convex. Individual areas are 4 to about 150 acres.

Typically, the surface layer is brown sandy loam about 7 inches thick. The upper part of the subsoil is yellowish brown sandy clay loam that extends to a depth of 10 inches. The middle part extends to a depth of 43 inches; between the depths of 10 and 32 inches it is yellowish brown clay that is mottled with very pale brown below a depth of 20 inches, and between the depths of 32 and 43 inches it is mottled red and yellowish brown clay that has very pale brown mottles. The lower part of the subsoil is red clay loam that has brownish yellow and very pale brown mottles and that extends to a depth of about 55 inches. Below this, to a depth of 72 inches or more, is light red clay loam.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout except for the surface layer and the upper few inches of the subsoil in limed areas. Permeability is moderate, and available water capacity is medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are small areas of somewhat poorly drained soils in concave areas and along narrow drainageways. A few small areas of soils that have slopes of more than 6 percent and small areas of soils from which the surface has been removed for road construction are included. Also included are a few small intermingled areas of Cataula, Durham, Helena, and Madison soils. Included soils make up about 5 to 15 percent of this map unit, but separate areas generally are less than 1 acre.

This soil has high potential for hay, pasture, row crops, and small grains. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, contour farming, stripcropping, terraces, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has high potential for most urban uses. The clayey subsoil has moderate permeability, which is a moderate limitation for septic tank absorption fields. This limitation, however, can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IIe; woodland group 3o.

ApC—Appling sandy loam, 6 to 10 percent slopes. This deep, well drained, sloping soil is on ridgetops and along slopes adjacent to and at the heads of shallow drainageways. Slopes generally are smooth and convex. Individual areas are 4 to about 80 acres.

Typically, the surface layer is brown sandy loam about 7 inches thick. The upper part of the subsoil is yellowish brown sandy clay loam that extends to a depth of 10 inches. The middle part extends to a depth of 43 inches; between the depths of 10 and 32 inches it is yellowish brown clay that is mottled with very pale brown below a depth of 20 inches, and between the depths of 32 and 43 inches it is mottled red and yellowish brown clay that has very pale brown mottles. The lower part of the subsoil is red clay loam that has brownish yellow and very pale brown mottles and that extends to a depth of about 55 inches. Below this, to a depth of 72 inches or more, is light red clay loam.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout except for the surface layer and the upper few inches of the subsoil in limed areas. Permeability is moderate, and available water capacity is medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are small areas of somewhat poorly drained soils in concave areas and along narrow drainageways. A few small areas of soils that have slopes of less than 6 percent or of more than 10 percent are included. Also included are a few small intermingled areas of Cataula and Madison soils. Included soils make up about 10 to 20 percent of this map unit, but separate areas generally are less than 1 acre.

This soil has medium potential for row crops and small grains. Its potential is limited because of slope. It has high potential for hay and pasture. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, contour farming, stripcropping, terraces, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has medium potential for most urban uses. The clayey subsoil has moderate permeability, which is a moderate limitation for septic tank absorption fields. This limitation, however, can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IIIe; woodland group 3o.

BuB—Buncombe sand, 0 to 4 percent slopes. This deep, excessively drained, nearly level to gently sloping soil is along the major streams. Slopes are irregular and convex. Individual areas are 5 to about 40 acres.

Typically, the surface layer is brown sand about 9 inches thick. The upper part of the underlying material is yellowish brown and brownish yellow sand that extends to a depth of about 50 inches. The lower part, to a depth of 76 inches or more, is yellowish brown sand that has light yellowish brown mottles.

This soil is low in natural fertility and organic matter content. It is medium acid to very strongly acid throughout except for the surface layer in limed areas. Permeability is rapid, and available water capacity is low to very low. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Chewacla and Toccoa soils. Included soils make up 5 to 10 percent of the map unit, but separate areas generally are less than 2 acres.

This soil has very low potential for row crops, small grains, hay, pasture, and vegetables. Its potential is limited because of the flooding hazard and the droughty condition of the soil. Good tilth can be easily maintained by returning crop residue to the soil.

Potential is medium for eastern cottonwood, loblolly pine, sweetgum, yellow-poplar, and American sycamore. The flooding hazard and the droughty condition of the soil are moderate limitations to equipment use and cause seedling mortality.

This soil has very low potential for urban uses. Flooding is a severe limitation that is very difficult to overcome. Capability subclass IIIs; woodland group 2s.

CaB—Cataula sandy loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on broad ridgetops, adjacent to shallow drainageways, and at the heads of drainageways. Slopes are smooth and generally convex. Individual areas are 4 to about 100 acres.

Typically, the surface layer is brown sandy loam about 6 inches thick. The upper part of the subsoil extends to a depth of 23 inches; it is red clay that has reddish yellow mottles below a depth of 16 inches. The middle part extends to a depth of 58 inches; it is a red and yellowish red, brittle fragipan of clay loam that is mottled in varying shades of yellow, very pale brown, and gray clay. The lower part is yellowish red clay loam that has yellow and white mottles and that extends to a depth of about 67 inches. Below this, to a depth of 74 inches or more, is yellowish red loam that has brownish yellow and white mottles.

This soil is low in natural fertility and organic matter content. It is medium acid to very strongly acid throughout except for the surface layer in limed areas. Permeability is slow, and available water capacity is medium to low. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is shallow to moderately deep over a brittle fragipan.

Included with this soil in mapping are a few small areas of soils that have slopes of more than 6 percent. Some areas include soils that have a subsoil of clay and soils in which the lower part of the subsoil is sandy loam. Also included are soils that have a surface layer of sandy clay loam or clay loam; these areas are 1/8 acre to 3 acres. Also included are a few small intermingled areas of Appling, Cecil, Davidson, Enon, Helena, Hiwassee, Madison, and Mecklenburg soils. Included soils make up 10 to 20 percent of this map unit, but separate areas generally are less than 3 acres.

This soil has medium potential for row crops and small grains. Its potential is limited because of the restricted root penetration in the fragipan. It has high potential for hay and pasture (fig. 1). Good tilth is easily maintained by returning crop residue to the soil. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, terraces, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has medium potential for most urban uses. The fragipan and the low strength of the soils are limitations, but these limitations can be overcome by good design and careful installation procedures. The fragipan has slow permeability, which is a severe limitation for septic tank absorption fields. This limitation is very difficult to overcome. Capability subclass IIIe; woodland group 3o.

CaC—Cataula sandy loam, 6 to 10 percent slopes. This deep, well drained, sloping soil is on narrow ridges, adjacent to drainageways, and at the heads of drainageways. Slopes are smooth and convex. Individual areas are 4 to about 50 acres.

Typically, the surface layer is brown sandy loam about 6 inches thick. The upper part of the subsoil extends to a depth of 23 inches; it is red clay that has reddish yellow mottles below a depth of 16 inches. The middle part extends to a depth of 58 inches; it is a red and yellowish red, brittle fragipan of clay loam that is mottled in varying shades of yellow, very pale brown, and gray clay. The lower part is yellowish red clay loam that has yellow and white mottles and that extends to a depth of about 67 inches. Below this, to a depth of 74 inches or more, is yellowish red loam that has brownish yellow and white mottles.

This soil is low in natural fertility and organic matter content. It is medium acid to very strongly acid throughout except for the surface layer in limed areas. Permeability is slow, and available water capacity is medium to low. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is shallow to moderately deep over a brittle fragipan.

Included with this soil in mapping are a few small areas of soils that have slopes of less than 6 percent or of more than 10 percent. Some areas include soils that have a subsoil of clay. In some places are included soils that have a surface layer of sandy clay loam or clay loam; these areas are 1/8 acre to 3 acres. Also included are a few small intermingled areas of Appling, Cecil, Davidson, Enon, Helena, Hiwassee, Madison, and Mecklenburg soils. Included soils make up 10 to 20 percent of this unit, but separate areas are generally less than 3 acres.

This soil has medium potential for row crops and small grains. Its potential is limited because of the restricted root penetration in the fragipan and because of slope. It has high potential for hay and pasture. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a very severe hazard if cultivated crops are grown. Minimum tillage, terraces, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has medium potential for most urban uses. The fragipan and the low strength of the soil are limitations, but these limitations can be overcome by good design and careful installation procedures. The fragipan has slow permeability, which is a severe limitation for septic tank absorption fields. This limitation is very difficult to overcome. Capability subclass IVe; woodland group 3o.

CbC2—Cataula sandy clay loam, 6 to 10 percent slopes, eroded. This deep, well drained, sloping soil is on narrow ridges, adjacent to drainageways, and at the heads of drainageways. Slopes are smooth and convex. Individual areas are 4 to about 30 acres.

Typically, the surface layer is reddish brown or yellowish red sandy clay loam about 3 inches thick. The upper part of the subsoil extends to a depth of 23 inches; it is red clay that has reddish yellow mottles below a depth of 16 inches. The middle part extends to a depth of 58 inches; it is a red and yellowish red, brittle fragipan of clay loam that is mottled in varying shades of yellow, very pale brown, and gray clay. The lower part is yellowish red clay loam that has yellow and white mottles and that extends to a depth of about 67 inches. Below this, to a depth of 74 inches or more, is yellowish red loam that has brownish yellow and white mottles.

This soil is low in natural fertility and organic matter content. It is medium acid to very strongly acid throughout except for the surface layer in limed areas. Permeability is slow, and available water capacity is medium to low. The soil has poor tilth and can be worked within only a narrow range of moisture conditions. The root zone is shallow to moderately deep over a brittle fragipan.

Included with this soil in mapping are a few small areas of soils that have slopes of less than 6 percent or of more than 10 percent. In some places are included soils that have a surface layer of sandy loam, and in some places are soils that have shallow gullies; these areas are 1/8 acre to 3 acres. Also included are a few small intermingled areas of Cecil, Enon, Helena, Hiwassee, Madison, and Mecklenburg soils. Included soils make up 10 to 20 percent of this map unit, but separate areas are generally less than 3 acres.

This soil has very low potential for row crops and small grains. Its potential is limited because of the eroded surface layer and the restricted root penetration in the fragipan. It has medium potential for hay and pasture.

Potential is low as woodland. The eroded surface layer is a moderate limitation to woodland use and management; erosion hazard, equipment limitations, and seedling mortality are concerns.

This soil has medium potential for most urban uses. The fragipan and the low strength of the soil are limitations, but these limitations can be overcome by good design and careful installation procedures. The fragipan has slow permeability, which is a severe limitation for septic tank absorption fields. This limitation is very difficult to overcome. Capability subclass VIe; woodland group 5c.

CcB—Cecil sandy loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on broad ridges and adjacent to drainageways. Slopes are smooth and convex. Individual areas are 4 to about 400 acres.

Typically, the surface layer is dark brown sandy loam about 5 inches thick. The upper part of the subsoil is red clay that extends to a depth of 19 inches. The middle part is red clay that has reddish yellow mottles and that extends to a depth of 38 inches. The lower part is red clay loam that has reddish yellow mottles and that extends to a depth of about 47 inches. Below this, to a depth of 61 inches or more, is red loam.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid

throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of soils that have slopes of more than 6 percent. In some places are included soils that have a surface layer of sandy clay loam or clay loam; these areas are 1/8 acre to 3 acres. Also included are a few small intermingled areas of Cataula, Davidson, Enon, Helena, Madison, and Mecklenburg soils. Included soils make up 10 to 20 percent of this map unit, but separate areas generally are less than 3 acres.

This soil has high potential for row crops, small grains, hay, and pasture. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, terraces, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has high potential for most urban uses. Low strength is a limitation, but this limitation can easily be overcome by good design and careful installation procedures. The clayey subsoil has moderate permeability, which is a moderate limitation for septic tank absorption fields. This limitation, however, can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IIe; woodland group 3o.

CcC—Cecil sandy loam, 6 to 10 percent slopes. This deep, well drained, sloping soil is on narrow ridges and adjacent to drainageways. Slopes are smooth and convex. Individual areas are 4 to about 100 acres.

Typically, the surface layer is dark brown sandy loam about 5 inches thick. The upper part of the subsoil is red clay that extends to a depth of 19 inches. The middle part is red clay that has reddish yellow mottles and that extends to a depth of 38 inches. The lower part is red clay loam that has reddish yellow mottles and that extends to a depth of about 47 inches. Below this, to a depth of 61 inches or more, is red loam.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of soils that have slopes of less than 6 percent or of more than 10 percent. In some places are included soils that have a surface layer of sandy clay loam or clay loam; these areas are 1/8 acre to 3 acres. Also included are a few small intermingled areas of Cataula, Davidson, Enon, Madison, and Mecklenburg soils. Included soils make up 10 to 20 percent of this map unit, but separate areas generally are less than 3 acres.

This soil has medium potential for row crops and small grains. It has high potential for hay and pasture (fig. 2). Good tilth is easily maintained by returning crop residue to the soil. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, terraces, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has medium potential for most urban uses. Low strength and slope are limitations, but these limitations can be easily overcome by good design and careful installation procedures. The clayey subsoil has moderate permeability, which is a moderate limitation for septic tank absorption fields. This limitation, however, can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IIIe; woodland group 3o.

CcD—Cecil sandy loam, 10 to 15 percent slopes. This deep, well drained, strongly sloping soil is adjacent to and at the heads of medium-sized and large drainageways. Slopes are smooth and convex. Individual areas are 4 to about 30 acres.

Typically, the surface layer is dark brown sandy loam about 5 inches thick. The upper part of the subsoil is red clay that extends to a depth of 19 inches. The middle part is red clay that has reddish yellow mottles and that extends to a depth of 38 inches. The lower part is red clay loam that has reddish yellow mottles and that extends to a depth of about 47 inches. Below this, to a depth of 61 inches or more, is red loam.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of soils that have slopes of less than 10 percent or of more than 15 percent. In some places are included soils that have a surface layer of sandy clay loam or clay loam; these areas are 1/8 acre to 3 acres. Also included are a few small intermingled areas of Cataula, Enon, Madison, and Wilkes soils. Included soils make up 10 to 20 percent of this map unit, but separate areas generally are less than 3 acres.

This soil has low potential for row crops and small grains. It has medium potential for hay and pasture. Its

potential is limited because of the strong slopes. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a very severe hazard if cultivated crops are grown. Minimum tillage, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has medium potential for most urban uses. Low strength and slope are limitations, but these limitations can be overcome by good design and careful installation procedures. The clayey subsoil has moderate permeability, which is a moderate limitation for septic tank absorption fields. This limitation, however, can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IVe; woodland group 3o.

CeB2—Cecil sandy clay loam, 2 to 6 percent slopes, eroded. This deep, well drained, gently sloping soil is on medium and narrow ridges and on slopes adjacent to drainageways. Slopes are smooth and convex. Individual areas are 4 to about 30 acres.

Typically, the surface layer is dark brown sandy clay loam about 3 inches thick. The upper part of the subsoil is red clay that extends to a depth of 19 inches. The middle part is red clay that has reddish yellow mottles and that extends to a depth of 38 inches. The lower part is red clay loam that has reddish yellow mottles and that extends to a depth of about 47 inches. Below this, to a depth of 61 inches or more, is red loam.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has poor tilth and can be worked within only a narrow range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of soils that have slopes of more than 6 percent. In some places are included soils that have a surface layer of sandy loam, and in some places are soils that have shallow gullies; these areas are 1/8 acre to 3 acres. Also included are a few small intermingled areas of Cataula, Enon, Helena, Madison, and Mecklenburg soils. Included soils make up 10 to 20 percent of this map unit, but separate areas generally are less than 3 acres.

This soil has medium potential for row crops, small grains, hay, and pasture. Its potential is limited because of the eroded surface layer. Tilth can be improved by returning crop residue to the soil. Erosion is a severe hazard where cultivated crops are grown. Minimum tillage, terraces, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine (fig. 3). The eroded surface layer is a moderate limitation to woodland use or management; erosion hazard, equipment limitations, and seedling mortality are concerns.

This soil has high potential for most urban uses. Low strength is a limitation, but this limitation can easily be overcome by good design and careful installation procedures. The clayey subsoil has moderate permeabiliy, which is a moderate limitation for septic tank absorption fields. This limitation, however, can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IIIe; woodland group 4c.

CeC2—Cecil sandy clay loam, 6 to 10 percent slopes, eroded. This deep, well drained, sloping soil is on narrow ridges, adjacent to drainageways, and at the heads of drainageways. Slopes are smooth and convex. Individual areas are 4 to about 50 acres.

Typically, the surface layer is dark brown sandy clay loam about 3 inches thick. The upper part of the subsoil is red clay that extends to a depth of 19 inches. The middle part is red clay that has reddish yellow mottles and that extends to a depth of 38 inches. The lower part is red clay loam that has reddish yellow mottles and that extends to a depth of about 47 inches. Below this, to a depth of 61 inches or more, is red loam.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has poor tilth and can be worked within only a narrow range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of soils that have slopes of less than 6 percent or of more than 10 percent. In some places are included soils that have a surface layer of sandy loam or clay loam, and in some places are soils that have shallow to deep gullies; these areas are 1/8 acre to 3 acres. Also included are a few small intermingled areas of Cataula, Helena, Hiwassee, and Madison soils. Included soils make up 5 to 15 percent of this map unit, but separate areas generally are less than 3 acres.

This soil has medium potential for row crops, small grains, hay, and pasture. Its potential is limited because of slope and the eroded surface layer. Tilth can be improved by returning crop residue to the soil. Erosion is a very severe hazard where cultivated crops are grown. Minimum tillage, terraces, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for growing loblolly pine. The eroded surface layer is a moderate limitation to woodland use or management; erosion hazard, equipment limitations, and seedling mortality are concerns.

This soil has medium potential for most urban uses. Low strength is a limitation, but this limitation can easily

be overcome by good design and careful installation procedures. The clayey subsoil has moderate permeability, which is a moderate limitation for septic tank absorption fields. This limitation, however, can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IVe; woodland group 4c.

Ch—Chewacla loam. This deep, somewhat poorly drained, nearly level soil is in narrow areas, about 100 to 600 feet wide, on first bottoms along the larger streams. Individual areas range from 20 to 200 acres.

Typically, the surface layer is brown loam about 9 inches thick. The upper part of the subsoil is dark yellowish brown, pale brown, and brown loam and silty clay loam that has black, strong brown, light brownish gray, and very pale brown mottles and that extends to a depth of 29 inches. The lower part extends to a depth of about 64 inches; it is mottled yellowish, grayish, and brownish clay loam and sandy clay loam. Below this, to a depth of 76 inches or more, is gray sandy loam that has dark yellowish brown and pale brown mottles.

This soil is medium in natural fertility and organic matter content. It is neutral to strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is high. The soil has fair tilth and can be worked within a moderate range of moisture conditions. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small intermingled areas of Buncombe and Toccoa soils. Also included in some places are small areas of poorly drained soils. Included soils make up 5 to 10 percent of the map unit, but separate areas generally are less than 3 acres.

This soil has medium potential for row crops and small grains. It has high potential for hay, pasture, and vegetables. Its potential is limited because of wetness and flooding. Tilth can be improved by returning crop residue to the soil.

Potential is very high for loblolly pine and hardwoods. Wetness and flooding are moderate limitations to equipment use, and seedling mortality is a concern in woodland use and management.

This soil has very low potential for urban uses. Wetness and flooding are severe limitations that are very difficult to overcome. Capability subclass IIIw; woodland group 1w.

DaB—Davidson loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on broad and medium ridges of uplands of the Piedmont. Slopes are smooth and convex. Individual areas are 4 to about 150 acres.

Typically, the surface layer is very dusky red loam about 5 inches thick. The upper part of the subsoil is dusky red and dark red clay that extends to a depth of 85 inches. The lower part is red clay loam that extends to a depth of 102 inches or more.

This soil is low in natural fertility and organic matter content. It is medium acid to very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has fair tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are a few small intermingled areas of Cecil and Mecklenburg soils. Also included are a few small areas of soils that have slopes of more than 6 percent. Included in a few places are soils that have a surface layer of sandy clay loam or clay loam; these areas are 1/8 acre to 3 acres. Included soils make up about 10 to 20 percent of this map unit, but separate areas generally are less than 3 acres.

This soil has high potential for row crops, small grains, hay, and pasture. Tilth can be improved by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, contour farming, stripcropping, terraces, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has high potential for most urban uses. The low strength is a limitation, but this limitation can be overcome by good design and careful installation procedures. The clayey subsoil has moderate permeability, which is a moderate limitation for septic tank absorption fields. This limitation, however, can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IIe; woodland group 3o.

DaC—Davidson loam, 6 to 10 percent slopes. This deep, well drained, sloping soil is on ridges and side slopes adjacent to small and medium-sized streams and at the heads of drainageways of uplands of the Piedmont. Slopes are smooth and convex. Individual areas are 4 to about 80 acres.

Typically, the surface layer is very dusky red loam about 5 inches thick. The upper part of the subsoil is dusky red and dark red clay that extends to a depth of 85 inches. The lower part is red clay loam that extends to a depth of 102 inches or more.

This soil is low in natural fertility and organic matter content. It is medium acid to very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has fair tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are a few small intermingled areas of Cecil and Mecklenburg soils. Also included are a few small areas of soils that have slopes of less than 6 percent or of more than 10 percent. Included in a few places are soils that have a surface layer of sandy clay loam or clay loam; these areas are 1/8 acre to

3 acres. Included soils make up about 10 to 20 percent of this map unit, but separate areas are less than 3 acres.

This soil has medium potential for row crops and small grains. Its potential is limited because of slope. It has high potential for hay and pasture. Tilth can be improved by returning crop residue to the soil. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, contour farming, stripcropping, terraces, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has medium potential for most urban uses. The low strength and slope are limitations, but these limitations can be overcome by good design and careful installation procedures. The clayey subsoil has moderate permeability, which is a moderate limitation for septic tank absorption fields. This limitation, however, can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IIIe; woodland group 3o.

DuB—Durham loamy sand, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on broad ridges of uplands of the Piedmont. Slopes are generally smooth and convex, but some are concave. Individual areas are 4 to about 60 acres.

Typically, the surface layer is brown loamy sand about 6 inches thick. The subsurface layer is light yellowish brown loamy sand that extends to a depth of 12 inches. The upper part of the subsoil is light yellowish brown sandy loam that extends to a depth of 18 inches. The middle part extends to a depth of 44 inches; it is yellowish brown or brownish yellow, or both, sandy clay loam that is mottled with reddish yellow below a depth of 32 inches. The lower part is brownish yellow sandy clay loam that has gray and yellowish red mottles and that extends to a depth of 56 inches. Below this, to a depth of 74 inches or more, is yellowish, grayish, and brownish sandy loam.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are somewhat poorly drained soils in small concave areas and along narrow drainageways. Small areas of soils that have slopes of more than 6 percent are included. Also included are a few small intermingled areas of Appling and Helena soils. Included soils make up about 5 to 15 percent of this map unit, but separate areas generally are less than 1 acre.

This soil has high potential for row crops, small grains, hay, and pasture. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, contour farming, stripcropping, terraces, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has high potential for most urban uses. Capability subclass IIe; woodland group 3o.

EnB—Enon sandy loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on broad ridges and slopes adjacent to small and medium-sized streams. Slopes are smooth and convex. Individual areas are 10 to 100 acres.

Typically, the surface layer is brown sandy loam about 6 inches thick. The upper part of the subsoil is reddish yellow and strong brown clay that extends to a depth of 26 inches. The lower part is strong brown sandy clay loam that has pale brown mottles and that extends to a depth of about 35 inches. Below this to a depth of 60 inches or more is brownish, yellowish, and grayish loam.

This soil is low in natural fertility and organic matter content. It is strongly acid to mildly alkaline throughout except for the surface layer in unlimed areas. Permeability is slow, and available water capacity is high. The soil has good tilth and can be worked throughout a wide range of moisture conditions.

Included with this soil in mapping are a few small intermingled areas of Cataula, Cecil, Helena, Iredell, Iredell Variant, and Mecklenburg soils. Also included are a few small areas of soils that have slopes of more than 6 percent. Included soils make up 10 to 20 percent of this map unit, but separate areas generally are less than 3 acres.

This soil has high potential for row crops, small grains, hay, and pasture. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, terraces, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine. There are no significant limitations to woodland use or management.

This soil has low potential for most urban uses. The low strength and high shrink-swell potential are limitations that are very difficult to overcome. The clayey subsoil has slow permeability, which is a severe limitation for septic tank absorption fields. This limitation is very difficult to overcome. Capability subclass IIe; woodland group 4o.

EnC—Enon sandy loam, 6 to 10 percent slopes. This deep, well drained, sloping soil is on ridges and side slopes adjacent to the small and medium-sized streams and at the heads of drainageways. Slopes are smooth and convex. Individual areas are 10 to about 60 acres.

Typically, the surface layer is brown sandy loam about 6 inches thick. The upper part of the subsoil is reddish yellow and strong brown clay that extends to a depth of

26 inches. The lower part is strong brown sandy clay loam that has pale brown mottles and that extends to a depth of about 35 inches. Below this to a depth of 60 inches or more is brownish, yellowish, and grayish loam.

This soil is low in natural fertility and organic matter content. It is strongly acid to mildly alkaline throughout except for the surface layer in unlimed areas. Permeability is slow, and available water capacity is high. The soil has good tilth and can be worked throughout a wide range of moisture conditions.

Included with this soil in mapping are a few small intermingled areas of Cataula, Cecil, Iredell, Mecklenburg, and Wilkes soils. Also included are a few small areas of soils that have slopes of less than 6 percent or of more than 10 percent. Included soils make up 10 to 15 percent of this map unit, but separate areas generally are less than 3 acres.

This soil has medium potential for row crops, small grains, hay, and pasture. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, terraces, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine. There are no significant limitations to woodland use or management.

This soil has low potential for most urban uses. The low strength and high shrink-swell potential are limitations that are very difficult to overcome. The clayey subsoil has slow permeability, which is a severe limitation for septic tank absorption fields. This limitation is very difficult to overcome. Capability subclass IIIe; woodland group 4o.

EnD—Enon sandy loam, 10 to 15 percent slopes. This deep, well drained, strongly sloping soil is on slopes adjacent to medium-sized and large streams and at the heads of drainageways. Slopes are smooth and convex. Individual areas are 4 to about 30 acres.

Typically, the surface layer is brown sandy loam about 6 inches thick. The upper part of the subsoil is reddish yellow and strong brown clay that extends to a depth of 26 inches. The lower part is strong brown sandy clay loam that has pale brown mottles and that extends to a depth of about 35 inches. Below this to a depth of 60 inches or more is brownish, yellowish, and grayish loam.

This soil is low in natural fertility and organic matter content. It is strongly acid to mildly alkaline throughout except for the surface layer in unlimed areas. Permeability is slow, and available water capacity is high. The soil has good tilth and can be worked throughout a wide range of moisture conditions.

Included with this soil in mapping are a few small intermingled areas of Cecil, Iredell, Mecklenburg, and Wilkes soils. Also included are a few small areas of soils that have slopes of less than 10 percent or of more than 15 percent. Included in some mapped areas are soils that are more acid than normal for Enon soils. Included soils make up 5 to 15 percent of this map unit, but separate areas generally are less than 3 acres.

This soil has low potential for row crops and small grains. It has medium potential for hay and pasture. Its potential is limited because of the strong slopes. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a very severe hazard if cultivated crops are grown. Minimum tillage, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine. There are no significant limitations to woodland use or management.

This soil has low potential for most urban uses. The low strength and high shrink-swell potential are limitations that are very difficult to overcome. The clayey subsoil has slow permeability, which is a severe limitation for septic tank absorption fields. This limitation is very difficult to overcome. Capability subclass IVe; woodland group 4o.

EnE—Enon sandy loam, 15 to 25 percent slopes. This deep, well drained, moderately steep soil is on short slopes adjacent to medium-sized and large streams. Individual areas are 6 to about 80 acres.

Typically, the surface layer is brown sandy loam about 6 inches thick. The upper part of the subsoil is reddish yellow and strong brown clay that extends to a depth of 26 inches. The lower part is strong brown sandy clay loam that has pale brown mottles and that extends to a depth of about 35 inches. Below this to a depth of 60 inches or more is brownish, yellowish, and grayish loam.

This soil is low in natural fertility and organic matter content. It is strongly acid to mildly alkaline throughout except for the surface layer in unlimed areas. Permeability is slow, and available water capacity is high. The soil has good tilth and can be worked throughout a wide range of moisture conditions.

Included with this soil in mapping are a few small intermingled areas of Mecklenburg, Pacolet, and Wilkes soils. Also included are a few small areas of soils that have slopes of less than 15 percent or of more than 25 percent. Included soils make up 10 to 20 percent of this map unit, but separate areas generally are less than 3 acres.

This soil has very low potential for row crops and small grains. It has low potential for hay and pasture. Its potential is limited because of the moderately steep slopes. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a very severe hazard if cultivated crops are grown. Because of the very severe erosion hazard, permanent cover needs to be established and maintained to reduce soil loss.

Potential is medium for loblolly pine. The moderately steep slopes are moderate limitations; the erosion hazard and equipment limitations are concerns in woodland use and management.

This soil has very low potential for urban uses. The low strength, high shrink-swell potential, and moderately steep slopes are limitations that are very difficult to overcome. The clayey subsoil has slow permeability, which is a severe limitation for septic tank absorption fields. This

limitation is very difficult to overcome. Capability subclass VIe; woodland group 4r.

HeB—Helena sandy loam, 2 to 6 percent slopes. This deep, moderately well drained, gently sloping soil is on irregularly shaped saddles between drainageways, on slopes adjacent to shallow drainageways, and at the heads of drainageways. Slopes are smooth and generally convex. Individual areas are 5 to about 60 acres.

Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The upper part of the subsoil is yellowish brown sandy clay that has yellowish red mottles and that extends to a depth of 16 inches. The middle part is yellowish brown sandy clay that has red and light brownish gray mottles and that extends to a depth of 23 inches. The lower part is yellowish brown clay loam that has red, very pale brown, and light gray mottles and that extends to a depth of about 38 inches. Below this, to a depth of 60 inches or more, is reddish yellow sandy clay loam that is mottled with red and light gray.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout except for the surface layer in limed areas. Permeability is slow, and the available water capacity is medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are somewhat poorly drained soils in small concave areas and along narrow drainageways. In a few places small areas of soils that have slopes of more than 6 percent are included. Also included are a few small intermingled areas of Cataula, Cecil, Enon, and Mecklenburg soils. Included soils make up 5 to 15 percent of this map unit, but separate areas generally are less than 2 acres.

This soil has medium potential for row crops and small grains. Its potential is limited because of wetness. It has high potential for hay and pasture. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, contour farming, stripcropping, terraces, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. Wetness is a moderate limitation to equipment use in woodland use and management.

This soil has low potential for urban uses. The high shrink-swell potential is a severe limitation, but this limitation can be overcome by good design and careful installation procedures. The clayey subsoil has slow permeability, which is a severe limitation for septic tank absorption fields. This limitation is very difficult to overcome. Capability subclass IIe; woodland group 3w.

HsB—Hiwassee sandy loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on broad and medium ridges of uplands of the Piedmont. Slopes are smooth and convex. Individual areas are 4 to about 150 acres.

Typically, the surface layer is dark reddish brown sandy loam about 5 inches thick. The subsoil is dusky red clay to a depth of 31 inches and dark red clay to a depth of 55 inches. It has reddish yellow mottles between the depths of 45 and 55 inches. Below this, to a depth of 72 inches or more, is red sandy clay loam.

This soil is low in natural fertility and organic matter content. It is slightly acid to very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are a few small intermingled areas of Cataula, Cecil, Davidson, Madison, and Mecklenburg soils. Also included are a few small areas of soils that have slopes of more than 6 percent or that have a surface layer of sandy clay loam or clay; these areas are 1/8 acre to 3 acres. Included soils make up about 5 to 15 percent of this unit, but separate areas generally are less than 3 acres.

This soil has high potential for row crops, small grains (fig. 4), hay, and pasture. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, contour farming, stripcropping, terraces, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has high potential for most urban uses. The low strength is a limitation, but this limitation can be overcome by good design and careful installation procedures. The clayey subsoil has moderate permeability, which is a moderate limitation for septic tank absorption fields. This limitation, however, can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IIe; woodland group 3o.

HsC—Hiwassee sandy loam, 6 to 10 percent slopes. This deep, well drained, sloping soil is on ridges and side slopes adjacent to small and medium-sized streams and at the heads of drainageways of uplands of the Piedmont. Slopes are smooth and convex. Individual areas are 4 to about 80 acres.

Typically, the surface layer is dark reddish brown sandy loam about 5 inches thick. The subsoil is dusky red clay to a depth of 31 inches and dark red clay to a depth of 55 inches. It has reddish yellow mottles between the depths of 45 and 55 inches. Below this, to a depth of 72 inches or more, is red sandy clay loam (fig. 5).

This soil is low in natural fertility and organic matter content. It is slightly acid to very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is

medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are a few small intermingled areas of Cataula, Cecil, Madison, and Mecklenburg soils. Also included are a few small areas of soils that have slopes of less than 6 percent or of more than 10 percent or that have a surface layer of sandy clay loam or clay loam; these areas are 1/8 acre to 3 acres. Included soils make up about 5 to 15 percent of the map unit, but separate areas generally are less than 3 acres.

This soil has medium potential for row crops, small grains, hay, and pasture. Its potential is limited because of slope. Good tilth is more easily maintained by returning crop residue to the soil. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, contour farming, stripcropping, terraces, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has medium potential for most urban uses. The low strength and slope are limitations, but these limitations can be overcome by good design and careful installation procedures. The clayey subsoil has moderate permeability, which is a. moderate limitation for septic tank absorption fields. This limitation can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IIIe; woodland group 3o.

HsD—Hiwassee sandy loam, 10 to 15 percent slopes. This deep, well drained, strongly sloping soil is on slopes adjacent to the medium-sized and large streams. Slopes are short, smooth, and convex. Individual areas are 4 to about 30 acres.

Typically, the surface layer is dark reddish brown sandy loam about 5 inches thick. The subsoil is dusky red clay to a depth of 31 inches and dark red clay to a depth of 55 inches. It has reddish yellow mottles between the depths of 45 and 55 inches. Below this, to a depth of 72 inches or more, is red sandy clay loam.

This soil is low in natural fertility and organic matter content. It is slightly acid to very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Madison, Mecklenburg, and Pacolet soils. Also included are a few small areas of soils that have slopes of less than 10 percent or of more than 15 percent or that have a surface layer of sandy clay loam or clay loam; these areas are 1/8 acre to 3 acres. Included soils make up about 5 to 15 percent of the map unit, but separate areas generally are less than 2 acres.

This soil has low potential for row crops and small grains. It has medium potential for hay and pasture. Its potential is limited because of the strong slopes. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a very severe hazard if cultivated crops are grown. Minimum tillage, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has medium potential for most urban uses. The low strength and slope are limitations, but these limitations can be overcome by good design and careful installation procedures. The clayey subsoil has moderate permeability, which is a moderate limitation for septic tank absorption fields. This limitation, however, can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IVe; woodland group 3o.

HwC2—Hiwassee clay loam, 6 to 10 percent slopes, eroded. This deep, well drained, sloping soil is on ridges and slopes adjacent to small and medium-sized streams. Slopes are smooth and convex. Individual areas are 4 to about 50 acres.

Typically, the surface layer is dark reddish brown clay loam about 3 inches thick. The subsoil is dusky red clay to a depth of 31 inches and dark red clay to a depth of 55 inches. It has reddish yellow mottles between the depths of 45 and 55 inches. Below this, to a depth of 72 inches or more, is red sandy clay loam.

This soil is low in natural fertility and organic matter content. It is slightly acid to very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has poor tilth and can be worked within only a narrow range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are a few small intermingled areas of Cataula, Cecil, Madison, and Mecklenburg soils. Also included are a few small areas of soils that have slopes of less than 6 percent or of more than 10 percent. Included in some mapped areas are soils that are less acid than is normal for Hiwassee soils. Included soils make up about 5 to 15 percent of the map unit, but separate areas generally are less than 3 acres.

This soil has low potential for row crops, small grains, hay, and pasture. Its potential is limited because of the eroded surface layer and the slope. Tilth can be improved by returning crop residue to the soil. Erosion is a very severe hazard if cultivated crops are grown. Minimum tillage, terraces, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine. The eroded surface layer is a moderate limitation; the erosion hazard, equipment limitations, and seedling mortality are concerns in woodland use and management.

This soil has medium potential for most urban uses. The low strength is a limitation, but this limitation can easily be overcome by good design and careful installation procedures. The clayey subsoil has moderate permeability, which is a moderate limitation for septic tank absorption fields. This limitation can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IVe; woodland group 4c.

HwD2—Hiwassee clay loam, 10 to 15 percent slopes, eroded. This deep, well drained, strongly sloping soil is on slopes adjacent to the medium-sized and large streams of uplands of the Piedmont. Slopes are short, smooth, and convex. Individual areas are 5 to about 40 acres.

Typically, the surface layer is dark reddish brown clay loam about 3 inches thick. The subsoil is dusky red clay to a depth of 31 inches and dark red clay to a depth of 55 inches. It has reddish yellow mottles between the depths of 45 and 55 inches. Below this, to a depth of 72 inches or more, is red sandy clay loam.

This soil is low in natural fertility and organic matter content. It is slightly acid to very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has poor tilth and can be worked within only a narrow range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are a few small intermingled areas of Cecil, Madison, Mecklenburg, and Pacolet soils. Also included in a few places are small areas of soils that have slopes of less than 10 percent or of more than 15 percent. Included in a few places are soils that have a surface layer of sandy loam or sandy clay loam, and in some places are soils that have small areas of shallow to deep gullies; these areas are 1/8 acre to 3 acres. Included soils make up about 5 to 15 percent of the map unit, but separate areas generally are less than 2 acres.

This soil has very low potential for row crops and small grains. It has low potential for hay and pasture. Its potential is limited because of the eroded surface layer and the strong slopes.

Potential is medium for loblolly pine. The eroded surface layer is a moderate limitation; the erosion hazard, equipment limitations, and seedling mortality are concerns in woodland use and management.

This soil has medium potential for most urban uses. The low strength and slope are limitations, but these limitations can be overcome by good design and careful installation procedures. The clayey subsoil has moderate permeability, which is a moderate limitation for septic tank absorption fields. This limitation can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass VIe; woodland group 4c.

IdB—Iredell fine sandy loam, 2 to 6 percent slopes. This soil is moderately deep over weathered bedrock. It is a moderately well drained to somewhat poorly drained, gently sloping soil on broad ridges of uplands of the Piedmont. Slopes are smooth and generally convex. Individual areas are 4 to about 300 acres.

Typically, the surface layer is grayish brown fine sandy loam about 5 inches thick. The upper part of the subsoil is light olive brown and olive clay that has black mottles and that extends to a depth of 22 inches. The lower part is olive clay loam that has light olive brown, black, and white mottles and that extends to a depth of about 27 inches. Below this, to a depth of 60 inches or more, is weathered bedrock, which crushes to olive loam that has white, greenish gray, and pale olive mottles.

This soil is low in natural fertility and organic matter content. It is slightly acid to moderately alkaline throughout. Permeability is slow, and available water capacity is high. The shrink-swell potential is high. The soil has fair tilth and can be worked within only a narrow range of moisture conditions. The root zone is moderately deep.

Included with this soil in mapping are a few small intermingled areas of Enon, Iredell Variant, Mecklenburg, and Wilkes soils. In a few places are small areas of soils that have slopes of less than 2 percent or of more than 6 percent. Also included in some mapped areas are soils that have a surface layer of clay loam. Included soils make up 5 to 15 percent of this map unit, but separate areas generally are less than 1 acre.

This soil has medium potential for most row crops (fig. 6) and small grains. Its potential is limited because of the slope and the plastic, clayey subsoil. It has high potential for cotton, hay, and pasture. Tilth can be improved by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, contour farming, stripcropping, terraces, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine. Potential is limited because of the moderately deep root zone and the plastic, clayey subsoil. The equipment limitation and seedling mortality are moderate limitations to woodland use and management.

This soil has very low potential for urban uses. The high shrink-swell potential and slow permeability are limitations and are very difficult to overcome. Capability subclass IIe; woodland group 4c.

IvA—Iredell Variant loam, 0 to 2 percent slopes. This deep, nearly level, poorly drained soil is in low-lying, flat areas and in areas adjacent to drainageways. Slopes are smooth and slightly concave. Individual areas are 4 to about 100 acres.

Typically, the surface layer is dark grayish brown loam about 8 inches thick. The upper part of the subsoil is mottled gray and light olive brown clay that extends to a depth of 18 inches. The middle part is very dark gray and

gray clay that has olive gray, light olive gray, and light olive brown mottles and that extends to a depth of 38 inches. The lower part is mottled dark gray, light olive brown, and clay loam that extends to a depth of 42 inches. Below this, to a depth of 60 inches or more, is mottled olive brown and light olive brown loam that has olive and white mottles.

This soil is low in organic matter content and natural fertility. It is neutral to moderately alkaline throughout except for the surface layer in unlimed areas. Permeability is slow, and available water capacity is high. The shrink-swell potential is high. The soil has poor tilth and can be worked within only a very narrow range of moisture conditions. The water table is at or near the surface in wet seasons. The root zone is deep.

Included with this soil in mapping are a few small intermingled areas of Iredell, Enon, and Mecklenburg soils. Also included are small areas of soils that have slopes of more than 2 percent and small areas of better drained soils. Included soils make up about 5 to 10 percent of this map unit, but separate areas generally are less than 1 acre.

This soil has medium potential for row crops, small grains, hay, and pasture. Its potential is limited because of wetness and the plastic, clayey subsoil. Tilth can be improved by returning crop residue to the soil.

Potential is medium for loblolly pine. Potential is limited because of wetness and the plastic, clayey subsoil. Wetness is a moderate limitation to equipment use and causes seedling mortality.

This soil has very low potential for urban uses. The high shrink-swell potential, slow permeability, and wetness are limitations and are very difficult to overcome. Capability subclass IIIw; woodland group 4w.

MaB—Madison sandy loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on broad ridges and slopes adjacent to small and medium-sized streams. Slopes are smooth and convex. Individual areas are 10 to about 200 acres.

Typically, the surface layer is brown sandy loam about 5 inches thick. The upper part of the subsoil extends to a depth of 24 inches; it is red clay that has brownish yellow mottles below a depth of 13 inches. The lower part is red clay loam that has brownish yellow and very pale brown mottles and that extends to a depth of about 37 inches. Below this, to a depth of 60 inches or more, is reddish, brownish, and grayish sandy clay loam.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are a few small intermingled areas of Appling, Cataula, and Hiwassee soils. Also included are a few small areas of soils that have slopes of more than 6 percent. Included in some places are soils that have a surface layer of clay loam or sandy clay loam; these areas are 1/8 acre to 3 acres. Included soils make up 10 to 20 percent of this map unit, but separate areas generally are less than 3 acres.

This soil has high potential for row crops, small grains, hay, and pasture. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, terraces, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has high potential for most urban uses. The low strength is a limitation, but this limitation can easily be overcome by careful design and installation procedures. The clayey subsoil has moderate permeability, which is a moderate limitation for septic tank absorption fields. This limitation, however, can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IIe; woodland group 3o.

MaC—Madison sandy loam, 6 to 10 percent slopes. This deep, well drained, sloping soil is on ridges and side slopes adjacent to the small and medium-sized streams and the heads of drainageways. Slopes are smooth and convex. Individual areas are 10 to about 50 acres.

Typically, the surface layer is brown sandy loam about 5 inches thick. The upper part of the subsoil extends to a depth of 24 inches; it is red clay that has brownish yellow mottles below a depth of 13 inches. The lower part is red clay loam that has brownish yellow and very pale brown mottles and that extends to a depth of about 37 inches. Below this, to a depth of 60 inches or more, is reddish, brownish, and grayish sandy clay loam.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are a few small intermingled areas of Appling, Cataula, and Hiwassee soils. Also included are a few small areas of soils that have slopes of less than 6 percent or of more than 10 percent. Included in some places are soils that have a surface layer of clay loam or sandy clay loam; these small areas are 1/8 acre to 3 acres.

Typically, the surface layer is brown sandy loam about 7 inches thick. The upper part of the subsoil is yellowish brown sandy clay loam that has light olive brown, brownish yellow, and black mottles and that extends to a depth of 12 inches. The lower part is light olive brown sandy clay loam that has pale brown, light gray, and black mottles and that extends to a depth of 16 inches. Below

this, to a depth of 44 inches or more, is black and pale brown mottles.

This soil has medium potential for row crops and small grains. It has high potential for hay and pasture. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, terraces, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has medium potential for most urban uses. The low strength and slope are limitations, but these limitations can be easily overcome by good design and careful installation procedures. The clay subsoil has moderate permeability, which is a moderate limitation for septic tank absorption fields. This limitation, however, can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IIIe; woodland suitability group 3o.

MaD—Madison sandy loam, 10 to 15 percent slopes. This deep, well drained, strongly sloping soil is on slopes adjacent to medium-sized and large streams and at the heads of drainageways. Slopes are smooth and convex. Individual areas are 4 to about 30 acres.

Typically, the surface layer is brown sandy loam about 5 inches thick. The upper part of the subsoil extends to a depth of 24 inches; it is red clay that has brownish yellow mottles below a depth of 13 inches. The lower part is red clay loam that has brownish yellow and very pale brown mottles and that extends to a depth of about 37 inches. Below this, to a depth of 60 inches or more, is reddish, brownish, and grayish sandy clay loam.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are a few small intermingled areas of Hiwassee, Pacolet, and Wilkes soils. Also included are a few small areas of soils that have slopes of less than 10 percent or of more than 15 percent. Included in some places are soils that have a surface layer of clay loam or sandy clay loam. Included soils make up 5 to 10 percent of the map unit, but separate areas are less than 3 acres.

This soil has low potential for row crops and small grains. It has medium potential for hay and pasture. Its potential is limited because of the strong slopes. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a very severe hazard if cultivated crops are grown. Minimum tillage, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has medium potential for most urban uses. The low strength and slopes are limitations, but these limitations can be overcome by good design and careful installation procedures. The clay subsoil has moderate permeability, which is a moderate limitation for septic tank absorption fields. This limitation, however, can be overcome by increasing the size of the absorption area or by modifying the filter field. Capability subclass IVe; woodland group 3o.

MaF—Madison sandy loam, 15 to 40 percent slopes. This deep, well drained, moderately steep and steep soil is on short slopes adjacent to medium-sized and large streams. Slopes are smooth and convex. Individual areas are 10 to 70 acres.

Typically, the surface layer is brown sandy loam about 5 inches thick. The upper part of the subsoil extends to a depth of 24 inches; it is red clay that has brownish yellow mottles below a depth of 13 inches. The lower part is red clay loam that has brownish yellow and very pale brown mottles and that extends to a depth of about 37 inches. Below this, to a depth of 60 inches or more, is reddish, brownish, and grayish sandy clay loam.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil is easily penetrated by plant roots.

Included with this soil in mapping are a few small intermingled areas of Hiwassee, Pacolet, and Wilkes soils. Also included are a few small areas of soils that have slopes of less than 15 percent. Included in some places are soils that have a surface layer of clay loam or sandy clay loam and a few small areas of soils that have small to large gullies; these areas are 1/8 acre to 3 acres. Included soils make up 5 to 15 percent of this map unit, but separate areas generally are less than 3 acres.

This soil has very low potential for row crops, small grains, hay, and pasture. Its potential is limited because of the moderately steep and steep slopes. Erosion is a very severe hazard if cultivated crops are grown. Because of the very severe erosion hazard, permanent cover needs to be established and maintained to reduce soil loss.

Potential is medium for loblolly pine and most hardwoods. The moderately steep and steep slopes are moderate limitations; erosion hazard and equipment limitations are concerns in woodland use and management.

This soil has low potential for urban use. The moderately steep and steep slopes are limitations that are difficult to overcome. Capability subclass VIIe; woodland group 3r.

MeB—Mecklenburg sandy loam, 2 to 6 percent slopes. This soil is deep over weathered bedrock. It is a well drained, gently sloping soil on broad, medium-sized ridges of uplands of the Piedmont. Slopes are smooth and convex. Individual areas are 4 to about 150 acres.

Typically, the surface layer is reddish brown sandy loam about 6 inches thick. The upper part of the subsoil extends to a depth of 33 inches; it is yellowish red clay that has reddish brown mottles below a depth of 23 inches. The lower part is reddish yellow clay loam that has yellow mottles and that extends to a depth of about 44 inches. Below this, to a depth of 63 inches or more, is weathered bedrock that crushes to strong brown loam that has yellow and red mottles.

This soil is low in natural fertility and organic matter content. It is medium acid to neutral throughout. Permeability is slow, and available water capacity is medium. The soil has good tilth and can be worked within a medium range of moisture conditions. The root zone is deep to moderately deep.

Included with this soil in mapping are a few small intermingled areas of Cataula, Cecil, Davidson, Enon, Iredell, and Wilkes soils. Also included are soils that have a surface layer of clay loam or that have slopes of more than 6 percent; these areas are 1/8 acre to 3 acres. Included soils make up 5 to 15 percent of the map unit, but separate areas are generally less than 3 acres.

This soil has high potential for row crops, small grains, hay, and pasture. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage, terraces, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has low potential for urban use. The low strength is a severe limitation, but this limitation can be overcome by good design and careful installation procedures. The clayey subsoil has slow permeability, which is a severe limitation for septic tank absorption fields. This limitation, however, is very difficult to overcome. Capability subclass IIe; woodland group 4o.

MeC—Mecklenburg sandy loam, 6 to 10 percent slopes. This soil is deep over weathered bedrock. It is a well drained, sloping soil on ridges and side slopes adjacent to small and medium-sized streams and at the heads of drainageways. Slopes are smooth and convex. Individual areas are 4 to 80 acres.

Typically, the surface layer is reddish brown sandy loam about 6 inches thick. The upper part of the subsoil extends to a depth of 33 inches; it is yellowish red clay that has reddish brown mottles below a depth of 23 inches. The lower part is reddish yellow clay loam that has yellow mottles and that extends to a depth of about 44 inches. Below this, to a depth of 63 inches or more, is weathered bedrock that crushes to strong brown loam that has yellow and red mottles.

This soil is low in natural fertility and organic matter content. It is medium acid to neutral throughout. Permeability is slow, and available water capacity is medium. The soil has good tilth and can be worked within a medium range of moisture conditions. The root zone is deep to moderately deep.

Included with this soil in mapping are a few small intermingled areas of Cataula, Cecil, Davidson, Enon, Hiwassee, Iredell, and Wilkes soils. Also included are soils that have a surface layer of clay loam or that have slopes of less than 6 percent or of more than 10 percent; these areas are 1/8 acre to 3 acres. Included soils make up 5 to 15 percent of the map unit, but separate areas are generally less than 3 acres.

This soil has medium potential for row crops, small grains, hay, and pasture. Its potential is limited because of slope. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, terraces, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use and management.

This soil has low potential for urban use. The low strength is a severe limitation, but this limitation can be overcome by good design and careful installation procedures. The clayey subsoil has slow permeability, which is a severe limitation for septic tank absorption fields. This limitation is very difficult to overcome. Capability subclass IIIe; woodland group 4o.

MeD—Mecklenburg sandy loam, 10 to 15 percent slopes. This soil is deep over weathered bedrock. It is a well drained, gently sloping soil on slopes adjacent to medium-sized and large streams and at the heads of drainageways. Slopes are smooth and convex. Individual areas are 4 to about 30 acres.

Typically, the surface layer is reddish brown sandy loam about 6 inches thick. The upper part of the subsoil extends to a depth of 33 inches; it is yellowish red clay that has reddish brown mottles below a depth of 23 inches. The lower part is reddish yellow clay loam that has yellow mottles and that extends to a depth of about 44 inches. Below this, to a depth of 63 inches or more, is weathered bedrock that crushes to strong brown loam that has yellow and red mottles.

This soil is low in natural fertility and organic matter content. It is medium acid to neutral throughout. Permeability is slow, and available water capacity is medium. The soil has good tilth and can be worked throughout a medium range of moisture conditions. The root zone is deep to moderately deep.

Included with this soil in mapping are a few small intermingled areas of Enon, Hiwassee, Pacolet, and Wilkes soils. Also included are soils that have a surface layer of

clay loam or that have slopes of less than 10 percent or of more than 15 percent; these areas are 1/8 acre to 3 acres. Included soils make up 10 to 20 percent of the map unit, but separate areas are generally less than 3 acres.

This soil has low potential for row crops and small grains. It has medium potential for hay and pasture. Its potential is limited because of the strong slopes. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a very severe hazard if cultivated crops are grown. Minimum tillage, contour farming, stripcropping, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has low potential for urban use. The low strength is a severe limitation, but this limitation can be overcome by good design and careful installation procedures. The clayey subsoil has slow permeability, which is a severe limitation for septic tank absorption fields. This limitation, however, is very difficult to overcome. Capability subclass IVe; woodland group 4o.

PaF—Pacolet sandy loam, 15 to 40 percent slopes. This soil is moderately deep over weathered bedrock. It is a well drained, moderately steep to steep soil on the short slopes adjacent to medium-sized and large streams. Individual areas are 10 to about 100 acres.

Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is red clay to a depth of 19 inches and red clay loam to a depth of 31 inches. Below this, to a depth of 60 inches or more, is weathered bedrock that crushes to red loam.

This soil is low in natural fertility and organic matter content. It is medium acid to very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is low or medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is moderately deep.

Included with this soil in mapping are a few small intermingled areas of Enon, Madison, and Wilkes soils. Included in some mapped areas are small areas of red soils and small areas of soils that are less acid than normal for Pacolet soils. Also included are a few small areas of soils that have slopes of less than 15 percent or of more than 40 percent and soils that have a surface layer of sandy clay loam or clay loam or that have deep gullies; these areas are 1/8 acre to 3 acres. Included soils make up 5 to 15 percent of this map unit, but separate areas generally are less than 3 acres.

This soil has very low potential for row crops, small grains, hay, and pasture. Its potential is limited because of the moderately steep and steep slopes. Erosion is a very severe hazard if cultivated crops are grown. Because of the very severe erosion hazard, permanent cover needs to be established and maintained to reduce soil loss.

Potential is medium for loblolly pine and yellow-poplar. The moderately steep and steep slopes are moderate limitations; erosion hazard and equipment limitations are concerns in woodland use and management.

This soil has low potential for urban uses. The moderately steep and steep slopes are limitations that are difficult to overcome. Capability subclass VIIe; woodland group 3r.

PcE3—Pacolet clay loam, 10 to 25 percent slopes, gullied. This soil is moderately deep over weathered bedrock. It is a well drained, strongly sloping to moderately steep soil on slopes adjacent to small and medium-sized streams. Rills, galled areas, shallow V-shaped gullies, and deep U-shaped gullies occupy about 3 to 10 percent of most areas. In some areas these gullies are active and have cut down as far as the unweathered bedrock. Individual areas are 4 to about 30 acres.

Typically, the surface layer is yellowish red clay loam about 2 inches thick. The subsoil is red clay to a depth of 19 inches and red clay loam to a depth of 31 inches. Below this, to a depth of 60 inches or more, is weathered bedrock that crushes to red loam.

This soil is low in natural fertility and organic matter content. It is medium acid to very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is low or medium. The soil has poor tilth and can be worked within only a narrow range of moisture conditions. The root zone is moderately deep.

Included with this soil in mapping are a few small intermingled areas of Enon, Madison, and Wilkes soils. Included in some mapped areas are small areas of red soils and small areas of soils that are less acid than normal for Pacolet soils. Also included are a few small areas of soils that have slopes of less than 10 percent or of more than 25 percent or that have a surface layer of sandy loam or sandy clay; these areas are 1/8 acre to 3 acres. Included soils make up 10 to 20 percent of the map unit, but separate areas generally are less than 3 acres.

This soil has very low potential for row crops, small grains, hay, and pasture. Its potential is limited because of the eroded surface layer and the strong and moderately steep slopes. Because erosion is a very severe hazard where cultivated crops are grown, the soil is best suited to trees.

Potential is medium for loblolly pine and yellow-poplar. The eroded surface layer and the strong and moderately steep slopes and seedling mortality are concerns in woodland use and management.

This soil has low potential for most urban uses. The erosion hazard and slope are limitations that are difficult to overcome. Capability subclass VIIe; woodland group 4c.

Tc—Toccoa sandy loam. This deep, well drained, nearly level soil is on flood plains of the Piedmont Plateau. Individual areas are 4 to about 150 acres.

Typically, the surface layer is dark brown sandy loam about 5 inches thick. The upper part of the underlying

material, to a depth of 39 inches, is yellowish red sandy loam and loamy sand that contains thin bedding planes of silt loam, sandy loam, and sand. The next layer is brownish, reddish, and yellowish fine sandy loam that extends to a depth of 51 inches. Below this, to a depth of 65 inches or more, is brown silt loam mottled with yellowish red and grayish brown.

This soil is low in natural fertility and medium in organic matter content. It is strongly acid to slightly acid throughout except for the surface layer in limed areas. Permeability is moderately rapid, and available water capacity is medium. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is deep, and the soil can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of soils that have a surface layer of loam and a few small areas of recently overwashed soils. A few small intermingled areas of Chewacla soils are included. In places a few soils that are more sandy throughout and soils that are more poorly drained and more clayey throughout are included. The included soils make up 10 to 20 percent of this map unit, but separate areas generally are less than 2 acres.

This soil has low potential for row crops and small grains. Its potential is limited because of the size of mapped areas and because of flooding. It has high potential for hay and pasture. Good tilth can be easily maintained by returning crop residue back to the soil.

Potential is very high for loblolly pine and most hardwoods. There are no significant limitations to woodland use or management.

This soil has very low potential for urban uses. Flooding is a severe limitation and is very difficult to overcome. Capability subclass IIIw; woodland group 1o.

WkD—Wilkes sandy loam, 6 to 15 percent slopes. This soil is shallow over weathered bedrock. It is a well drained, sloping to strongly sloping soil on slopes adjacent to small and medium-sized streams. Individual areas are 4 to about 40 acres.

Typically, the surface layer is brown sandy loam about 7 inches thick. The upper part of the subsoil is yellowish brown sandy clay loam that has light olive brown, brownish yellow, and black mottles and that extends to a depth of 12 inches. The lower part is light olive brown sandy clay loam that has pale brown, light gray, and black mottles and that extends to a depth of 16 inches. Below this, to a depth of 44 inches or more, is weathered bedrock that crushes to yellowish brown loam that has black and pale brown mottles.

This soil is low in organic matter content and natural fertility. It is slightly acid to mildly alkaline throughout except for the surface layer in unlimed areas. Permeability is moderately slow, and available water capacity is low to very low. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is shallow.

Included with this soil in mapping are a few small intermingled areas of Davidson, Enon, Hiwassee, Iredell, Mecklenburg, and Pacolet soils. Also included are a few small areas of soils that have slopes of less than 6 percent or of more than 15 percent; these areas are 1/8 acre to 3 acres. Included soils make up about 10 to 20 percent of the map unit, but separate areas generally are less than 3 acres.

This soil has very low potential for row crops and small grains. It has low potential for hay and pasture. Its potential is limited because the soil is shallow and droughty and because of the sloping to strong slopes. Tilth can be improved by returning crop residue to the soil. Erosion is a severe hazard if cultivated crops are grown. Because of the severe erosion hazard, permanent cover needs to be established and maintained to reduce soil loss.

Potential is medium for loblolly pine and most hardwoods. There are no significant limitations to woodland use and management.

This soil has medium potential for most urban uses. The depth to rock and slope are limitations, but these limitations can be overcome by good design and careful installation procedures. The depth to rock is a severe limitation for septic tank absorption fields; this limitation is very difficult to overcome. Capability subclass VIe; woodland group 4o.

WkF—Wilkes sandy loam, 15 to 40 percent slopes. This soil is shallow over weathered bedrock. It is a well drained, moderately steep to steep soil on slopes adjacent to medium-sized and large streams. Individual areas are 10 to about 80 acres.

Typically, the surface layer is brown sandy loam about 7 inches thick. The upper part of the subsoil is yellowish brown sandy clay loam that has light olive brown, brownish yellow, and black mottles and that extends to a depth of 12 inches. The lower part is light olive brown sandy clay loam that has pale brown, light gray, and black mottles and that extends to a depth of 16 inches. Below this, to a depth of 44 inches or more, is weathered bedrock that crushes to yellowish brown loam that has black and pale brown mottles.

This soil is low in organic matter content and natural fertility. It is slightly acid to mildly alkaline throughout except for the surface layer in unlimed areas. Permeability is moderately slow, and available water capacity is low or very low. The soil has good tilth and can be worked throughout a wide range of moisture conditions. The root zone is shallow.

Included with this soil in mapping are a few small intermingled areas of Enon, Madison, and Pacolet soils. Included in few mapped areas are small areas of soils that have shallow gullies and small areas of soils that have rock outcrops. Also included are a few small areas of soils that have slopes of less than 15 percent or of more than 40 percent; these areas are 1/8 acre to 3 acre.

This soil has very low potential for row crops, small grains, hay, or pasture. Erosion is a very severe hazard if

cultivated crops are grown. Because of the very severe erosion hazard, permanent cover needs to be established and maintained to reduce soil loss.

Potential is medium for loblolly pine and most hardwoods. The moderately steep and steep slopes are moderate limitations; erosion hazard and equipment use limitations are concerns in woodland use and management.

This soil has low potential for urban use. The moderately steep and steep slopes are limitations that are difficult to overcome. Capability subclass VIIe; woodland group 4r.

Use and management of the soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic tank disposal systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture, rangeland, and woodland, as sites for buildings, highways and other transportation systems, sanitary facilities, and parks and other recreation facilities, and for wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of bedrock, wetness, or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

Charles A. Holden, Jr., conservation agronomist, Soil Conservation Service, helped prepare this section.

The major management concerns in the use of the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best suited to the soil, including some not commonly grown in the survey area, are discussed; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential of the survey area and about the management practices that are needed. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Soil maps for detailed planning." Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

More than 89,000 acres in the survey area was used for crops and pasture in 1967, according to the South Carolina Soil and Water Conservation Needs Inventory. Of this total 35,000 acres was used for permanent pasture, and about 54,000 acres was used for field crops, mainly soybeans, corn, cotton, wheat, and oats.

The potential of the soils in Abbeville County for increased production of food is good. Food production could be increased considerably by extending the latest crop production technology to all cropland in the county. This soil survey can greatly facilitate the application of such technology.

Acreage in crops and pasture has gradually been decreasing as more and more land is used for urban development. It was estimated that in 1967, about 14,000 acres (*6*) was urban and built-up land in the county. This figure has been growing at the rate of about 270 acres each year. The use of this soil survey to help make land use decisions that will influence the future role of farming in the county is discussed in the section "General soil map for broad land use planning."

Soil erosion is the major concern on about 94 percent of the land in Abbeville County. If slope is more than 2 percent, erosion by water is a hazard. Most soils in Abbeville County that are used for crops have slopes of more than 2 percent and are subject to damage by water erosion.

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially

damaging on soils that have a clayey subsoil, such as Cecil, Hiwassee, and Madison soils, and on soils that have a layer in or below the subsoil that limits the depth of the root zone. Such layers include a fragipan, as in Cataula soils. Erosion also reduces productivity on soils that tend to be droughty. Second, soil erosion on farmland results in sedimentation. Control of erosion minimizes the pollution of streams by sediment and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

In many sloping fields, preparing a good seedbed and tilling are difficult on clayey or hardpan spots because the original friable surface soil has been eroded away. Such spots are common in areas of eroded Cecil and Hiwassee soils.

Water erosion can be controlled by water management systems that include diversions, terraces, contour tillage, and grassed waterways. Cropping systems that include sod crops in the rotation and tillage that leaves protective residue on the surface also help control water erosion. Erosion control practices provide protective surface cover, reduce runoff, and increase infiltration. On livestock farms, which require pasture and hay, the legume and grass forage crops in the cropping system reduce erosion on sloping land, provide nitrogen, and improve tilth for the following crop.

These practices can be adapted to most soils in the survey area, but they are more difficult to use successfully on eroded soils. No-tillage for corn is effective in reducing erosion on sloping land and can be adapted to most soils in the survey area.

Terraces and diversions reduce the length of slope and reduce runoff and erosion. They are most practical on deep, well drained soils that have regular slopes. Appling, Cataula, Cecil, Davidson, Durham, Hiwassee, Madison, and Mecklenburg soils are suitable for terraces. The other soils are less suitable for terraces and diversions because of steep slopes, the erosion hazard, and slow permeability.

Contouring and contour stripcropping are erosion control practices in parts of the survey area. They are best adapted to soils that have smooth, uniform slopes, including most areas of the sloping Appling, Cataula, Cecil, Davidson, Enon, Helena, Hiwassee, Iredell, Madison, and Mecklenburg soils.

Information for the design of erosion control practices for each kind of soil is contained in the Technical Guide, available in local offices of the Soil Conservation Service.

Soil drainage is not a major management concern in the survey area.

About 5 percent of the total acreage—the Chewacla, Helena, Iredell, and Iredell Variant soils—needs artificial drainage. Small areas of wetter soils along drainageways and in swales are commonly included in areas of Chewacla and Toccoa soils. Artificial drainage is needed in some of these wetter areas.

Soil fertility is naturally low in all soils in the survey area. All of the soils in Abbeville County need regular application of lime and fertilizer. Nearly all of these soils on uplands are naturally strongly acid or very strongly acid, and if they have never been limed, applications of ground limestone are required to raise the pH level sufficiently for crop growth. Available phosphorus and potash levels are naturally low in most of these soils. On all soils additions of lime and fertilizer should be based on the results of soil tests, on the need of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Soil tilth is an important factor in the germination of seeds and in the infiltration of water into the soil. Soils with good tilth are granular and porous.

Most of the soils used for crops in the survey area have a surface layer of sandy loam and are low in content of organic matter. Generally the structure of such soils is weak and granular, which is about ideal for good germination of seeds and infiltration of water. Organic matter content and soil structure can be improved through the use of tillage systems that leave a mulch of crop residue on the surface. Regular additions of crop residue, manure, and other organic material can help to increase organic matter content and improve the structure of the surface layer.

Fall plowing is generally not a good practice on the county's soils because most of the cropland consists of sloping soils that are subject to damaging erosion if they are plowed in the fall. If erosion can be controlled, fall plowing generally results in good tilth in spring.

Field crops suited to the soils and climate of the survey area include many that are not now commonly grown. Corn, cotton, soybeans, and, increasingly, grain sorghum are the row crops. Sunflowers, peanuts, potatoes, squash, cucumbers, okra, and similar crops can be grown if economic conditions are favorable.

Wheat and oats are the common close-growing crops. Rye and barley grow well, and grass seed could be produced from fescue, orchardgrass, and redtop.

Special crops grown commercially in the survey area are vegetables, small fruits, tree fruits, and nursery plants. A small acreage throughout the county is used for melons, strawberries, sweetcorn, tomatoes, and other vegetables. In addition, large areas can be adapted to other special crops, such as grapes, peaches, pears, and many vegetables.

Deep soils that have good natural drainage and that warm up early in spring are especially well suited to many vegetables. Examples are the Appling, Cataula, Cecil, Durham, and Hiwassee soils. Crops can generally be planted and harvested early on all these soils.

Latest information and suggestions for growing special crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in tables 6 and 7. In any given year, yields may be

higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the crop is not suited to or not commonly grown on the soil.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. Hay and pasture yields were estimated for the most productive varieties of grasses and legumes suited to the climate and the soil. A few farmers may be obtaining average yields higher than those shown in tables 6 and 7.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

The estimated yields reflect the productive capacity of the soils for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in tables 6 and 7 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forest trees, or for engineering purposes.

In Abbeville County, all kinds of soil are grouped at two levels: the capability class and subclass. These levels are defined in the following paragraphs. A survey area may not have soils of all classes.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and landforms have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is indicated in table 8. All soils in the survey area except those named at a level higher than the series are included. Some of the soils that are well suited to crops and pasture may be in low-intensity use, for example, soils in capability classes I and II. Data in this table can be used to determine the farming potential of such soils.

The capability subclass is identified in the description of each soil map unit in the section "Soil maps for detailed planning."

Woodland management and productivity

NORMAN W. RUNGE, forester, Soil Conservation Service, helped prepare this section.

Originally, Abbeville County was mainly wooded, and trees still cover about 60 percent of the county. Good stands of commercial trees are produced in the woodlands of the county. Needleleaf species are grown most frequently on the hills, and broadleaf species generally dominate on the bottomlands along the rivers and creeks.

The value of wood products is substantial, though it is below its potential. Other uses of the county's woodland include grazing, wildlife, recreation, natural beauty, and conservation of soil and water. This section has been provided to explain how soils affect tree growth and management in the county.

Table 9 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Map unit symbols for soils suitable for wood crops are listed, and the ordination (woodland group) symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: x, w, t, d, c, s, f, and r.

In table 9 the soils are also rated for a number of factors to be considered in management. *Slight*, *moderate*, and *severe* are used to indicate the degree of major soil limitations.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if some measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or equipment; *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree that the soil affects expected mortality of planted tree seedlings. Plant competition is not considered in the ratings. Seedlings from good planting stock that are properly planted during a period of sufficient rainfall are rated. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

The *potential productivity* of merchantable or *important trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Important trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suitable for commercial wood production and that are suited to the soils.

Woodland understory vegetation

Understory vegetation consists of grasses, forbs, shrubs, and other plants. Some types of forest, under proper management, can produce enough understory vegetation to support grazing of livestock or wildlife, or both.

The quantity and quality of understory vegetation vary with the kind of soil, the age and kind of trees, the density of the canopy, and the depth and condition of the forest litter. The density of the forest canopy affects the amount of light that understory plants receive during the growing season.

Engineering

RICHARD G. CHRISTOPHER, III, area engineer, Soil Conservation Service, helped prepare this section.

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 10 shows, for each kind of soil, the degree and kind of limitations for building site development; table 11, for sanitary facilities; and table 13, for water management. Table 12 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have a special meaning in soil science. Many of these terms are defined in the Glossary.

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 10. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 10 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 10 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones affect stability and ease of excavation.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 11 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, or *poor*, which, respectively, mean about the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and shallowness to bedrock interfere with installation. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand and gravel or fractured bedrock is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Soils that are very high in content of organic matter and those that have cobbles, stones, or boulders are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil material. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness can be a limitation, because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

Ease of excavation affects the suitability of a soil for the trench type of landfill. A suitable soil is deep to bedrock and free of large stones and boulders. If the seasonal water table is high, water will seep into trenches.

Unless otherwise stated, the limitations in table 11 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more or-

ganic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 12 by ratings of good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 16 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low potential frost action, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor.*

Sand and *gravel* are used in great quantities in many kinds of construction. The ratings in table 12 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 16.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel, stones, or soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 13 the degree of soil limitation and soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Soil and site limitations are expressed as slight, moderate, and severe. *Slight* means that the soil properties and site features are generally favorable for the specified use and that any limitation is minor and easily overcome. *Moderate* means that some soil properties or site features are unfavorable for the specified use but can be overcome or modified by special planning and design. *Severe* means that the soil properties and site features

are so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Large stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock, hardpan, or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; salinity and alkalinity; and availability of outlets for drainage.

Irrigation is affected by such features as slope, susceptibility to flooding, hazards of water erosion and soil blowing, texture, presence of salts and alkali, depth of root zone, rate of water intake at the surface, permeability of the soil below the surface layer, available water capacity, need for drainage, and depth to the water table.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock, hardpan, or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, soil blowing, soil slipping, and piping.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Recreation

There are many varied and extensive recreational facilities throughout the county, including parks, athletic fields, playgrounds, tennis courts, swimming pools, horse and motorcycle trails, and golf courses. The City of Abbeville has a recreation center for many indoor sports and gatherings. The Savannah River, the Rocky River, the Little River, the Saluda River, Secession Lake, and the many other streams and farm ponds throughout the county offer an abundant supply of water for residential, industrial, and farm uses and for fishing and swimming as well.

The Forest Service, paper companies, and other landowners control several thousand acres in the county. These landowners are cooperating with the South Carolina Wildlife and Marine Resources Department in keeping these lands well stocked with deer, turkey, and small game. Most of these lands are open to the public for hunting during scheduled seasons.

All of these recreational facilities are made accessible by the many miles of paved highways in the county. With many varied and extensive recreational facilities throughout the county and the good highway system, the recreation potential of Abbeville County is very high.

The soils of the survey area are rated in table 14 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 14 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 11, and interpretations for dwellings without basements and for local roads and streets, given in table 10.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing camping sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that will increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones or boulders, is firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over bedrock or hardpan should be enough to allow necessary grading.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They should have moderate slopes and have few or no stones or boulders on the surface.

Wildlife habitat

WILLIAM W. NEELY, biologist, Soil Conservation Service, helped prepare this section.

Wildlife was most important to the early settlers in Abbeville County. These settlers depended upon cottontail rabbits, grey squirrels, and deer for food and hides for trade. Now, hunting has become a sport rather than a source of food or income. The principal game species are cottontails, squirrels, deer, doves, and bobwhite quail.

A wide variety of wildlife habitat exists in Abbeville County, and this in turn attracts a diversity of wildlife species. In proper season, every bird species common to the Piedmont in South Carolina can be found in one part of the county or another. Farm ponds, Lake Secession, and streams produce favorable conditions for wetland habitat. Bottom land hardwoods provide excellent habitat for woodland wildlife.

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, is inadequate, or is inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 15, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

The elements of wildlife habitat are briefly described in the following paragraphs.

Grain and seed crops are seed-producing annuals used by wildlife. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, and clover.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are beggarweed, pokeweed, partridgepea, ragweed, wild beans, and panicums.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of native plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are commercially available and suitable for planting on soils rated *good* are pyracantha, autumn-olive, and liqustrum.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous

plants are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and eastern redcedar.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, and rushes, sedges, and reeds.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control structures in marshes or streams. Major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kinds of wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail rabbit, and red fox.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Wetland habitat consists of open, marshy or swampy, shallow water areas where water-tolerant plants grow. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Soil properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features, engineering test data, and data obtained from physical and chemical laboratory analyses of soils.

Engineering properties

Table 16 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 16 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 16 in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The estimated classification, without group index numbers, is given in table 16.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Ranges in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterburg limits extend a marginal amount across classification boundaries (1 or 2 percent), the classification in the marginal zone is omitted.

Physical and chemical properties

Table 17 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Soil and water features

Table 18 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains or after snow melts is not considered flooding, nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding; and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated in table 18 are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 60 inches. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Soil series and morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*5*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or map units, of each soil series are described in the section "Soil maps for detailed planning."

Appling series

The Appling series consists of deep, well drained, moderately permeable soils that formed in material weathered from granite, gneiss, and schist. These gently sloping and sloping soils are on medium and broad ridges. Slopes range from 2 to 10 percent.

Appling soils are geographically closely associated with Cataula, Cecil, Durham, Helena, and Madison soils. Cataula soils, which are on adjacent slopes, have a fragipan. Cecil soils, which are on adjacent slopes, have a redder B2t horizon. Durham soils, which are on adjacent slopes, have a fine-loamy control section. Helena soils, which are in slightly lower areas, have gray mottles within the upper 24 inches of the B horizon. Madison soils, which are on slightly higher convex ridges, have a redder and more micaceous B2t horizon.

Typical pedon of Appling sandy loam, 2 to 6 percent slopes, about 3 miles south of Antreville and about 6 miles northeast of Lowndesville, about 0.5 mile north of junction of South Carolina Highway 284 and South Carolina Secondary Highway 72, about 400 feet east of South Carolina Highway 284, and about 20 feet northeast of field road:

Ap—0 to 7 inches; brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; few fine and medium roots; medium acid; abrupt smooth boundary.

B1—7 to 10 inches; yellowish brown (10YR 5/4) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few medium roots; medium acid; abrupt smooth boundary.

B21t—10 to 20 inches; yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure; firm, sticky, plastic; thin patchy distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

B22t—20 to 32 inches; yellowish brown (10YR 5/6) clay; common medium prominent red (2.5YR 4/6) and few fine distinct very pale brown (10YR 7/3) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; thin continuous distinct clay films on faces of peds; few fine flakes of mica; strongly acid; gradual smooth boundary.

B23t—32 to 43 inches; mottled red (2.5YR 4/8) and yellowish brown (10YR 5/6) clay; common fine distinct very pale brown (10YR 7/3) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; thin continuous distinct clay films on faces of peds; few fine flakes of mica; strongly acid; gradual smooth boundary.

B3—43 to 55 inches; red (2.5YR 4/8) clay loam; common medium distinct brownish yellow (10YR 6/6) and few fine distinct very pale brown (10YR 7/3) mottles; weak medium subangular blocky structure; firm, sticky, plastic; thin patchy faint clay films on faces of peds; few fine flakes of mica; strongly acid; clear wavy boundary.

C—55 to 72 inches; light red (2.5YR 6/6) clay loam; many fine prominent (10YR 8/1) white and few medium distinct brownish yellow (10YR 6/6) mottles; massive; friable, slightly sticky, slightly plastic; common fine flakes of mica; saprolite that crushes easily; strongly acid.

Solum thickness ranges from 44 to 56 inches. The soil is strongly acid or very strongly acid in all horizons except for the A and B1 horizons in limed areas. Depth to hard rock is more than 60 inches.

The Ap horizon is 6 to 8 inches thick and is brown, pale brown, or grayish brown. The A2 horizon, where present, is yellowish brown or pale brown sandy loam 4 to 8 inches thick.

The B1 horizon, where present, is 3 to 6 inches thick and is yellowish brown, strong brown, or brownish yellow sandy clay loam or sandy loam. The B2t horizon is 17 to 45 inches of strong brown, reddish yellow, yellowish red, or yellowish brown clay or sandy clay. The lower part has common to many mottles in shades of brown, red, and yellow. The B3 horizon is 7 to 15 inches of red, yellowish brown, or brownish yellow sandy clay loam, clay, or clay loam. It has mottles in shades of brown, red, and yellow.

The C horizon is brownish yellow, yellowish red, light red, red, or mottled light gray, yellowish brown, red, and light yellowish brown sandy clay loam or sandy loam saprolite.

Buncombe series

The Buncombe series consists of excessively drained, rapidly permeable soils that formed in dominantly sandy alluvial sediments on natural levees along some of the larger streams. These deep, nearly level to gently sloping soils formed in alluvial sediments deposited close to the streambanks by fast-moving floodwater. These soils are subject to frequent flooding for short periods. Slopes range from 0 to 4 percent.

Buncombe soils are geographically closely associated with Chewacla and Toccoa soils. Buncombe soils contain less clay than Chewacla and Toccoa soils and are excessively drained. Chewacla soils are somewhat poorly drained and Toccoa soils are well drained.

Typical pedon of Buncombe sand, 0 to 4 percent slopes, about 1.5 miles northwest of Ware Shoals, about 4.25 miles northeast of Donalds, about 1.13 miles east of junction of South Carolina Highways 252 and 184, about 3,500 feet east of South Carolina Secondary Highway 69, and about 500 feet west of Saluda River:

Ap—0 to 9 inches; brown (10YR 4/3) sand; single grained; loose; many fine roots; few fine flakes of mica; medium acid; abrupt smooth boundary.

C1—9 to 28 inches; yellowish brown (10YR 5/8) sand; single grained; loose; few fine and medium roots; few fine flakes of mica; medium acid; clear wavy boundary.

C2—28 to 50 inches; brownish yellow (10YR 6/6) sand; single grained; loose; few fine flakes of mica; strongly acid; gradual wavy boundary.

C3—50 to 76 inches; yellowish brown (10YR 5/6) sand; few fine distinct light yellowish brown (10YR 6/4) mottles; single grained; loose; few fine flakes of mica; strongly acid.

Depth to hard rock is more than 60 inches. Reaction is medium acid to very strongly acid throughout except for the A horizon in limed areas.

The A horizon is brown, dark yellowish brown, or yellowish brown sand or loamy sand 2 to 10 inches thick.

The upper part of the C horizon is very pale brown, pale brown, brown, yellowish brown, dark yellowish brown, brownish yellow, and reddish yellow sand or loamy sand. The lower part of the C horizon is olive yellow, brownish yellow, yellowish brown, and light yellowish brown sand or loamy sand that has light yellowish brown and very pale brown mottles.

Cataula series

The Cataula series consists of well drained, slowly permeable soils that formed in material weathered from granite, gneiss, or schist. These soils are deep to bedrock, but the root zone is shallow to moderately deep to the fragipan. These gently sloping to sloping soils are on narrow and broad ridges and adjacent to drainageways. Slopes range from 2 to 10 percent.

Cataula soils are geographically closely associated with Appling, Cecil, Davidson, Helena, Hiwassee, and Madison soils. Cataula soils have a fragipan, which Appling, Cecil, Davidson, Helena, Hiwassee, and Madison soils do not have.

Typical pedon of Cataula sandy loam, 2 to 6 percent slopes, about 5.5 miles southwest of Due West, 6.25 miles southeast of Antreville, about 1 mile south of junction of

South Carolina Highway 201 and South Carolina Secondary Highway 39, and about 50 feet east of unnumbered county dirt road:

Ap—0 to 6 inches; brown (10YR 5/3) sandy loam; weak fine granular structure; very friable; common fine and medium roots; medium acid; abrupt smooth boundary.

B21t—6 to 16 inches; red (2.5YR 5/8) clay; moderate medium subangular blocky structure; firm; thin continuous distinct clay films on faces of peds; few fine roots; few coarse sand grains; strongly acid; gradual smooth boundary.

B22t—16 to 23 inches; red (2.5YR 5/8) clay; few medium prominent reddish yellow (7.5YR 6/6) mottles; moderate medium angular and subangular blocky structure; very firm; thick continuous prominent clay films on faces of peds; few fine roots; strongly acid; clear smooth boundary.

Bx1—23 to 35 inches; red (2.5YR 5/8) and yellowish red (5YR 5/8) clay loam horizontal layers 1 to 3 inches thick separated by yellow (10YR 7/6) and very pale brown (10YR 7/3) clay horizontal layers 1/2 to 1 inch thick; the yellow and very pale brown material also extends vertically through the red layers at 4- to 10-inch intervals; moderate very thick platy structure which parts to moderate medium angular blocky; the red material is brittle; the yellow and very pale brown material is very firm; thin continuous distinct clay films on horizontal and vertical faces of peds; few fine roots; few fragments of feldspar; strongly acid; gradual smooth boundary.

Bx2—35 to 58 inches; red (2.5YR 4/8) clay loam horizontal layers 1 to 2 inches thick separated by yellow (10YR 7/8) and very pale brown (10YR 7/4) clay horizontal layers 1/2 to 1 inch thick; the yellow and very pale brown material also extends vertically through the red layers at 3- to 10-inch intervals; the yellow and very pale brown horizontal and vertical layers are broken by mottles of gray (10YR 5/1) clay; moderate very thick platy structure which parts to moderate medium angular blocky; the red material is brittle; the yellow, very pale brown, and gray material is very firm; thin continuous distinct clay films on horizontal and vertical faces of peds; few fragments of feldspar; strongly acid; gradual smooth boundary.

B3—58 to 67 inches; yellowish red (5YR 5/8) clay loam; common medium prominent yellow (10YR 7/8) and few fine white (10YR 8/1) mottles; weak medium subangular blocky structure; firm; strongly acid; gradual smooth boundary.

C—67 to 74 inches; yellowish red (5YR 5/8) loam; common medium prominent brownish yellow (7.5YR 6/8) and few fine white (10YR 8/1) mottles; massive; friable; saprolite that crushes easily; strongly acid.

Solum thickness ranges from 41 to 67 inches or more. The soil is medium acid to very strongly acid throughout except for the A horizon in limed areas. Depth to hard rock is more than 60 inches. Depth to the fragipan ranges from 15 to 36 inches.

The A horizon is brown, yellowish brown, yellowish red, or reddish brown sandy loam or sandy clay loam. It is 2 to 6 inches thick.

The B1 horizon, where present, is yellowish red sandy clay loam about 3 inches thick. The B2t horizon is red. In some pedons it has yellow or brown mottles. It is 10 to 26 inches thick. The Bx horizon is 13 to 34 inches thick and is horizontally streaked with brown, yellow, and red. Some pedons contain gray material in the lower part. It is sandy clay loam, clay loam, or sandy clay. In some pedons, it has thin layers of clay. The B3 horizon is mottled with brown, yellow, red, and gray. It is 5 to 17 inches thick and is clay loam or sandy clay loam.

The C horizon is mottled red, brown, yellow, and white clay loam, sandy clay loam, loam, or sandy loam saprolite.

Cecil series

The Cecil series consists of deep, well drained, moderately permeable soils that formed in material weathered from granite, gneiss, or schist. These gently sloping to strongly sloping soils are on narrow and broad ridges and adjacent to drainageways. Slopes range from 2 to 15 percent.

Cecil soils are geographically closely associated with Appling, Cataula, Durham, Davidson, Helena, Hiwassee, Madison, and Pacolet soils. Appling, Durham, and Helena soils, which are on adjacent slopes, have a browner B2t horizon. Cataula soils, which are on adjacent slopes, have a fragipan. Davidson and Hiwassee soils, which are on adjacent slopes, have a dark red B2t horizon. Madison and Pacolet soils have a solum less than 40 inches thick.

Typical pedon of Cecil sandy loam, 2 to 6 percent slopes, about 1.13 miles northwest of Due West, about 4 miles southwest of Donalds, about 1.25 miles southwest of junction of South Carolina Highway 185 and South Carolina Secondary Highway 49, and about 75 feet west of road:

Ap—0 to 5 inches; dark brown (7.5YR 4/4) sandy loam; weak fine granular structure; very friable; few fine roots; medium acid; abrupt smooth boundary.

B21t—5 to 19 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm; thin patchy faint clay films on faces of peds; few fine roots; strongly acid; gradual wavy boundary.

B22t—19 to 38 inches; red (2.5YR 4/8) clay; few fine prominent reddish yellow (5YR 6/6) mottles; moderate medium subangular blocky structure; firm; thin patchy faint clay films on faces of peds; few fine roots; few fine flakes of mica; strongly acid; gradual wavy boundary.

B3—38 to 47 inches; red (2.5YR 4/8) clay loam; few medium prominent reddish yellow (5YR 6/8) mottles; weak medium subangular blocky structure; friable; thin patchy faint clay films on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary.

C—47 to 61 inches; red (2.5YR 5/8) loam; many medium prominent reddish yellow (5YR 6/8) and few fine faint yellow (10YR 7/6) mottles; massive; friable; many flakes of mica; saprolite that crushes easily; strongly acid.

Solum thickness ranges from 43 to 58 inches. Depth to hard rock is more than 60 inches. The soil is strongly acid or very strongly acid throughout except for the A horizon in limed areas.

The A horizon is 2 to 8 inches thick and is sandy loam or sandy clay loam. The surface horizon is dark grayish brown, grayish brown, brown, reddish brown, or yellowish red.

The B1 horizon, where present, is yellowish red or red sandy clay loam or clay loam. The B2t horizon is clay or clay loam 26 to 46 inches thick. In some pedons the lower part of the B2t horizon is mottled with brown or yellow. The B3 horizon is 5 to 16 inches thick and has mottles of yellow, brown, and red. It is clay loam or sandy clay loam.

The C horizon is red sandy loam, loam, clay loam, or sandy clay loam saprolite and has mottles of yellow, brown, pink, and white.

Chewacla series

The Chewacla series consists of deep, somewhat poorly drained, moderately permeable soils that formed in loamy alluvial sediments along the flood plains of the streams. These nearly level soils are subject to common flooding for short periods. They are on long, narrow first bottoms. Slopes are less than 2 percent.

Chewacla soils are geographically closely associated with Buncombe and Toccoa soils. Buncombe and Toccoa soils, which are in slightly higher areas, have more sand in the control section.

Typical pedon of Chewacla loam, about 8.5 miles southwest of Abbeville, about 1,050 feet north of South Carolina Highway 72, and about 1,650 feet east of Little River:

Ap—0 to 9 inches; brown (10YR 5/3) loam; weak fine granular structure; very friable; many fine roots; few fine and medium pores; few fine flakes of mica; neutral; abrupt smooth boundary.

B1—9 to 14 inches; dark yellowish brown (10YR 4/4) loam; common medium distinct pale brown (10YR 6/3) and common fine prominent black (10YR 2/1) mottles; moderate fine granular structure; very friable; common fine roots; few fine and medium pores; few fine flakes of mica; neutral; clear smooth boundary.

B21—14 to 21 inches; pale brown (10YR 6/3) silty clay loam; common medium prominent strong brown (7.5YR 5/6) and common fine prominent black (10YR 2/1) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; few fine black concretions; few fine flakes of mica; slightly acid; gradual smooth boundary.

B22—21 to 29 inches; brown (10YR 5/3) silty clay loam; common fine prominent light brownish gray (10YR 6/2) and common fine faint pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; few fine black concretions; few fine flakes of mica; slightly acid; gradual smooth boundary.

B23—29 to 53 inches; mottled brownish yellow (10YR 6/8), light gray (10YR 7/2), strong brown (7.5YR 5/6), and black (10YR 2/1) clay loam; weak medium subangular blocky structure; friable; few fine pores; few fine black concretions; few fine flakes of mica; slightly acid; gradual smooth boundary.

B3—53 to 64 inches; mottled gray (10YR 6/1), pale brown (10YR 6/3), strong brown (7.5YR 5/6), and brownish yellow (10YR 6/8) sandy clay loam; weak medium subangular blocky structure; friable; few fine black concretions; common fine flakes of mica; neutral; gradual smooth boundary.

Cg—64 to 76 inches; gray (10YR 5/1) sandy loam; common coarse distinct dark yellowish brown (10YR 4/4) and few medium faint pale brown (10YR 6/3) mottles; structureless; very friable; common fine flakes of mica; neutral.

Solum thickness ranges from 42 to 64 inches. Depth to hard rock is more than 60 inches. Reaction is strongly acid to neutral throughout except for the A horizon in limed areas. A few fine flakes of mica are throughout the profile.

The A horizon is brown or dark brown loam or silt loam 5 to 9 inches thick.

The B1 horizon, where present, is about 5 inches thick and is sandy loam or loam. Some pedons have pale brown and black mottles. The B2 horizon is 25 to 53 inches thick and is dark yellowish brown, yellowish brown, brownish yellow, brown, or pale brown silty clay loam, sandy clay loam, clay loam, or loam. It has mottles in shades of yellow, brown, gray, and black. The B3 horizon is 5 to 14 inches thick and is dark grayish brown to gray silty clay loam or sandy clay loam. It has mottles in shades of brown and yellow.

The C horizon is grayish brown to gray sandy loam, loamy sand, or sand. It has mottles in shades of gray, yellow, and brown.

Davidson series

The Davidson series consists of deep, well drained, moderately permeable soils that formed in material weathered from hornblende gneiss, hornblende schist, or diorite rock. These gently sloping to sloping soils are on narrow and broad ridges and on areas adjacent to shallow drainageways of the Piedmont uplands. Slopes range from 2 to 10 percent.

Davidson soils are geographically closely associated with Cataula, Cecil, Hiwassee, and Mecklenburg soils. Cataula soils have a red, yellowish red, or yellowish brown Bt horizon, have a fragipan 15 to 36 inches below the surface, and occur on adjacent slopes. Cecil soils have a red Bt horizon and occur on adjacent slopes. Hiwassee soils have a thinner solum than Davidson soils and occur on adjacent slopes. Mecklenburg soils are not so red as Davidson soils, have more than 35 percent base saturation, and occur in slightly lower areas.

Typical pedon of Davidson loam, 2 to 6 percent slopes, about 1.5 miles northeast of Calhoun Falls; about 2 miles southwest of intersection of South Carolina Secondary Highways 82 and 32, and 225 feet south of intersection of unnumbered dirt road and South Carolina Secondary Highway 82:

Ap—0 to 5 inches; very dusky red (10R 2/2) loam; weak fine granular structure; very friable, slightly sticky, slightly plastic; common fine roots; medium acid; clear smooth boundary.

B21t—5 to 22 inches; dusky red (10R 3/4) clay; moderate medium subangular blocky structure; firm, sticky, plastic; thin patchy distinct clay films on faces of peds; few fine roots; few fine oxide concretions; medium acid; gradual wavy boundary.

B22t—22 to 56 inches; dark red (10R 3/6) clay; moderate medium subangular blocky structure; firm, sticky, plastic; thick continuous prominent clay films on faces of peds; few fine roots in upper portion; few fine manganese concretions; strongly acid; gradual wavy boundary.

B23t—56 to 85 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; firm, sticky, plastic; thick continuous prominent clay films on faces of peds; strongly acid; gradual wavy boundary.

B3—85 to 102 inches; red (2.5YR 4/6) clay loam; few fine distinct yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure; firm, sticky, plastic; thin patchy distinct clay films on faces of peds; strongly acid.

Solum thickness and depth to hard rock is more than 60 inches. The soil is medium acid to very strongly acid throughout except for the surface layer in limed areas.

The A horizon is dark reddish brown or very dusky red loam or clay loam 4 to 7 inches thick.

The B2t horizon is dark red or dusky red clay that has brown and yellow mottles in the lower part. It is 46 to 80 inches thick. The B3 horizon is red or dark red clay or clay loam that has brown and yellow mottles.

Durham series

The Durham series consists of deep, well drained, moderately permeable soils that formed in material weathered from granite, gneiss, or schist. These gently sloping soils are on broad ridges. Slopes range from 2 to 6 percent.

Durham soils are geographically closely associated with Appling, Cecil, and Helena soils. Appling, Cecil, and Helena soils have more clay in the B2t horizon than Durham soils, and Cecil soils are redder.

Typical pedon of Durham loamy sand, 2 to 6 percent slopes, about 2.5 miles west of Donalds, about 0.25 mile west of intersection of South Carolina Secondary Highways 49 and 37, and about 100 feet southeast of South Carolina Secondary Highway 37:

Ap—0 to 6 inches; brown (10YR 4/3) loamy sand; weak fine granular structure; very friable; many fine roots, few medium roots; medium acid; clear smooth boundary.

A2—6 to 12 inches; light yellowish brown (10YR 6/4) loamy sand; weak fine granular structure; very friable; common fine roots, few medium roots; medium acid; clear smooth boundary.

B1—12 to 18 inches; light yellowish brown (10YR 6/4) sandy loam; moderate medium granular structure; very friable; few fine roots; medium acid; clear smooth boundary.

B21t—18 to 32 inches; yellowish brown (10YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky; thin patchy faint clay films on faces of peds; few fine roots; strongly acid; gradual smooth boundary.

B22t—32 to 44 inches; brownish yellow (10YR 6/8) sandy clay loam; common medium faint light yellowish brown (10YR 6/4) and few medium prominent reddish yellow (5YR 6/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; thin patchy faint clay films on faces of peds; strongly acid; gradual smooth boundary.

B3—44 to 56 inches; brownish yellow (10YR 6/8) sandy clay loam; common medium prominent gray (10YR 6/1) and few fine prominent yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; thin patchy faint clay films on faces of peds; strongly acid; gradual smooth boundary.

C—56 to 74 inches; mottled brownish yellow (10YR 6/6), light gray (10YR 7/2), pale brown (10YR 6/3), and yellowish brown (10YR 5/6) sandy loam; very friable; saprolite that crushes easily; strongly acid.

Solum thickness ranges from 47 to 56 inches. Depth to hard rock is more than 60 inches. The soil is strongly acid or very strongly acid throughout except for the A and B1 horizons in limed areas.

Total thickness of the A horizon is 11 to 14 inches. The Ap horizon is 5 to 8 inches thick and is brown, grayish brown, or light brownish gray. The A2 horizon is 6 to 8 inches thick and is light yellowish brown, very pale brown, or light brownish gray.

The B1 horizon is 4 to 7 inches thick and is light yellowish brown, brownish yellow, or pale brown sandy loam or sandy clay loam. The B2t horizon is 18 to 29 inches thick. It is yellowish brown or brownish yellow sandy clay loam or clay loam that has mottles in shades of yellow and red. The B3 horizon is 8 to 13 inches thick. It is brownish yellow or yellowish brown sandy clay loam or clay loam that has mottles in shades of gray, yellow, red, brown, and white. Some pedons have intermingled colors of brownish yellow, yellow, red, and white.

The C horizon is mottled brownish yellow, light gray, pale brown, yellowish brown, very pale brown, pink, red, yellow, white, and yellowish red saprolite.

Enon series

The Enon series consists of deep, well drained, slowly permeable soils that formed in material weathered from diorite, gabbro, hornblende schist, or mixed acid and basic rocks. These gently sloping to moderately steep soils are on narrow to broad ridges and on side slopes. Slopes range from 2 to 25 percent.

Enon soils are geographically closely associated with Cataula, Cecil, Helena, Iredell, Iredell Variant, Mecklenburg, and Wilkes soils. Cataula and Cecil soils have a redder, less plastic subsoil than Enon soils. Helena soils have base saturation of less than 35 percent and have mottles with chroma of 2 or less within 24 inches below the top of the argillic horizons. Iredell and Iredell Variant soils have montmorillonitic mineralogy. In addition, Iredell Variant soils have gray argillic horizons. Mecklenburg soils have redder argillic horizons than Enon soils. Wilkes soils have a solum less than 20 inches thick.

Typical pedon of Enon sandy loam, 2 to 6 percent slopes, about 3.75 miles south of Lowndesville, about 6 miles northwest of Calhoun Falls, about 1.25 miles northeast of junction of South Carolina Secondary Highways 123 and 65, and about 100 feet west of unnumbered county dirt road:

Ap—0 to 6 inches; brown (10YR 5/3) sandy loam; weak fine granular structure; very friable; many fine and few medium roots; few pebbles of quartz ranging in size from 2 to 20 mm in diameter; few fine dark oxide concretions; medium acid; abrupt smooth boundary.

B21t—6 to 16 inches; reddish yellow (7.5YR 6/6) clay; moderate medium angular blocky structure; firm, sticky, very plastic; thin continuous distinct clay films on faces of peds; few fine and medium roots; few fine dark oxide concretions; slightly acid; gradual wavy boundary.

B22t—16 to 26 inches; strong brown (7.5YR 5/6) clay; moderate medium angular blocky structure; very firm, sticky, very plastic; thin continuous distinct clay films on faces of peds; few medium roots; few fine dark oxide concretions; neutral; gradual wavy boundary.

B3—26 to 35 inches; strong brown (7.5YR 5/6) sandy clay loam; few medium prominent pale brown (10YR 6/3) mottles; weak medium angular blocky structure; firm, slightly sticky, slightly plastic; thin patchy faint clay films on faces of peds; few fine dark oxide concretions; few pebbles of quartz ranging in size from 2 to 20 mm in diameter; few fine flakes of mica; neutral; gradual wavy boundary.

C—35 to 60 inches; mottled strong brown, brownish yellow, very pale brown, and light brownish gray loam; friable; saprolite that crushes easily; neutral.

Solum thickness ranges from 30 to 40 inches. Depth to hard rock is more than 60 inches. Reaction ranges from strongly acid to mildly alkaline throughout except for the surface layer in unlimed areas. Dark colored concretions are few or common throughout the soil.

The Ap horizon is 5 to 9 inches thick and is brown, dark brown, grayish brown, or dark grayish brown sandy loam or fine sandy loam. The A1 horizon is 4 to 6 inches thick. It is dark grayish brown, grayish brown, or brown sandy loam or fine sandy loam. The A2 horizon, where present, is about 4 inches thick. It is brown or brownish yellow sandy loam.

The B1 horizon, where present, is about 3 to 7 inches thick. It is yellowish brown or brown sandy clay loam. The B2t horizon is 14 to 24 inches thick. It is yellowish brown, brownish yellow, reddish yellow, strong brown, or light olive brown and has mottles in varying shades of brown, black, yellow, and red. The B3 horizon is 4 to 14 inches thick. It is yellowish brown, brownish yellow, strong brown, or light olive brown and has mottles in varying shades of brown, yellow, black, white, red, and gray. Some pedons are mottled with varying shades of brown, black, yellow, olive, red, and gray. The texture of the B3 horizon is clay loam, sandy clay loam, or clay.

The C horizon is yellowish brown, olive, brownish yellow, or light olive brown and has mottles in varying shades of brown, yellow, red, gray, black, white, and green. Some pedons are mottled with varying shades of brown, yellow, red, gray, black, white, and green. The C horizon is loam, sandy loam, or clay loam saprolite.

Helena series

The Helena series consists of deep, moderately well drained, slowly permeable soils that formed in material weathered from aplitic granite or granite gneiss. These gently sloping soils are on irregularly shaped ridges, adjacent to drainageways, and at the heads of drainageways. Slopes range from 2 to 6 percent.

Helena soils are geographically closely associated with Appling, Cataula, Cecil, Durham, Enon, and Mecklenburg soils. Appling, Cataula, and Cecil soils do not have low-chroma mottles in the upper part of the B horizon and are less sticky in the B2t horizon. Durham soils have clay content of less than 35 percent in the B horizon. Enon and Mecklenburg soils have base saturation of more than 35 percent.

Typical pedon of Helena sandy loam, 2 to 6 percent slopes, about 3.5 miles north of Due West, about 9.5 miles northeast of Antreville, about 0.5 mile south of South Carolina Secondary Highways 112 and 89, and about 100 feet east of South Carolina Secondary Highway 89:

Ap—0 to 7 inches; grayish brown (2.5Y 5/2) sandy loam; weak fine granular structure; very friable; common fine and medium roots; neutral; abrupt smooth boundary.

B21t—7 to 16 inches; yellowish brown (10YR 5/6) sandy clay; few fine prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; thin continuous distinct clay films on faces of peds; few fine roots; medium acid; gradual wavy boundary.

B22t—16 to 23 inches; yellowish brown (10YR 5/6) sandy clay; common medium prominent red (2.5YR 5/8) and few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; very firm, sticky, plastic; thin continuous distinct clay films on faces of peds; strongly acid; clear wavy boundary.

B3—23 to 38 inches; yellowish brown (10YR 5/8) clay loam; common medium prominent red (2.5YR 5/8) and common fine distinct very pale brown (10YR 7/4) and light gray (10YR 7/2) mottles; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; few small fragments of feldspar; few fine flakes of mica; strongly acid; gradual wavy boundary.

C—38 to 60 inches; reddish yellow (7.5YR 6/8) sandy clay loam; common medium prominent red (2.5YR 5/8) and common fine distinct light gray (10YR 7/1) mottles; massive; friable; few fine flakes of mica; saprolite that crushes easily; strongly acid.

Solum thickness ranges from 35 to 40 inches. The soil is strongly acid or very strongly acid throughout except for the A horizon and the upper part of the B horizon in limed areas. Depth to rippable rock is more than 48 inches.

The Ap horizon is 6 to 7 inches thick and is grayish brown or pale brown.

The B1 horizon, where present, is about 4 or 5 inches thick. It is brownish yellow or reddish yellow sandy clay loam. The B2t horizon is 16 to 33 inches thick. It is yellowish brown, brownish yellow, or light yellowish brown clay, sandy clay, or clay loam. The lower part has few or common mottles of yellow, red, brown, and gray. The B3 horizon is 6 to 15 inches thick. It is strong brown, brownish yellow, yellowish brown, or yellowish red, or it is mottled light gray, brownish yellow, strong brown, yellowish red, red, very pale brown, and white. Texture is clay loam or sandy clay loam.

The C horizon is sandy loam, loam, sandy clay loam, or clay loam saprolite. It is reddish yellow or yellowish brown and has mottles of red, yellow, and gray. Some pedons are mottled brownish yellow, yellowish brown, reddish yellow, yellow, yellowish red, red, light gray, gray, and white.

Hiwassee series

The Hiwassee series consists of deep, well drained, moderately permeable soils that formed in material weathered from dark colored gneiss or schist. These gently sloping to strongly sloping soils are on narrow and broad ridges and adjacent to drainageways. Slopes range from 2 to 15 percent.

Hiwassee soils are geographically closely associated with Cataula, Cecil, Davidson, Madison, and Mecklenburg soils. Cataula soils have a fragipan. Cecil soils have a red B2t horizon. Davidson soils have a thicker solum than Hiwassee soils. Madison soils have a red, micaceous B2t horizon. Mecklenburg soils have base saturation of more than 35 percent.

Typical pedon of Hiwassee sandy loam, 2 to 6 percent slopes, about 1.5 miles northwest of Donalds, 6 miles west of Ware Shoals, about 0.5 mile north of junction of U.S. Highway 178 and South Carolina Secondary Highway 166, and about 100 feet west of South Carolina Secondary Highway 166:

Ap—0 to 5 inches; dark reddish brown (2.5YR 3/4) sandy loam; weak fine granular structure; very friable; many fine roots; few pebbles of quartz; slightly acid; abrupt smooth boundary.

B21t—5 to 31 inches; dusky red (10R 3/4) clay; moderate medium subangular blocky structure; firm, sticky, plastic; thick continuous prominent clay films on faces of peds; common fine roots; few pebbles of quartz; medium acid; gradual smooth boundary.

B22t—31 to 45 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; firm, sticky, plastic; thick continuous prominent clay films on faces of peds; few fine roots; few fine flakes of mica; strongly acid; gradual smooth boundary.

B23t—45 to 55 inches; dark red (2.5YR 3/6) clay; few medium distinct reddish yellow (5YR 6/8) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; thin patchy distinct clay films on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary.

C—55 to 72 inches; red (2.5YR 4/6) sandy clay loam; massive; friable, slightly sticky, slightly plastic; many fine flakes of mica; saprolite that crushes easily; strongly acid.

Solum thickness ranges from 44 to 67 inches. Depth to hard rock is more than 60 inches. Reaction is slightly acid to very strongly acid throughout except for the surface layer in limed areas.

The A horizon is 2 to 7 inches thick. It is dark red, dusky red, or dark reddish brown sandy loam, loam, sandy clay loam, or clay loam.

The B2t horizon is 26 to 50 inches thick and is dark red, dusky red, or dark reddish brown. Some pedons are red in the lower part, and some pedons have yellow, brown, and red mottles in the lower part. The B3 horizon is 6 to 29 inches thick. It is dark red or red and has yellow, brown, and red mottles in most places. It is clay, sandy clay loam, or clay loam.

The C horizon is red or dark red and has mottles of yellow, brown, pink, and white. Some pedons have a C horizon mottled with red, yellow, brown, pink, and white. It is sandy loam, loam, sandy clay loam, or clay loam saprolite.

Iredell series

The Iredell series consists of moderately deep, moderately well drained to somewhat poorly drained, slowly permeable soils that formed in material weathered from diorite, gabbro, hornblende schist, hornblende gneiss, and similar dark colored rocks. These gently sloping soils are on broad ridges. There are few to common dark colored concretions throughout the soil. Slopes range from 2 to 6 percent.

Iredell soils are geographically closely associated with Enon, Iredell Variant, Mecklenburg, and Wilkes soils. Enon soils have mixed mineralogy. Iredell Variant soils have a thicker B2t horizon and are poorly drained. Mecklenburg soils have a redder B2t horizon. Wilkes soils have a thinner Bt horizon and have mixed mineralogy.

Typical pedon of Iredell fine sandy loam, 2 to 6 percent slopes, about 2.5 miles northeast of Calhoun Falls, about 1 mile west of junction of South Carolina Secondary Highways 82 and 32, and about 75 feet south of South Carolina Secondary Highway 82:

Ap—0 to 5 inches; grayish brown (2.5Y 5/2) fine sandy loam; weak fine granular structure; very friable; common fine roots; few dark oxide concretions; medium acid; abrupt smooth boundary.

B21t—5 to 11 inches; light olive brown (2.5Y 5/6) clay; few fine prominent black (10YR 2/1) mottles; weak medium angular blocky structure; very firm, very sticky, very plastic; thick continuous prominent clay films on faces of peds; few fine roots; few dark oxide concretions; neutral; gradual smooth boundary.

B22t—11 to 22 inches; olive (5Y 5/3) clay; common medium prominent black (5Y 2/1) mottles; weak medium angular blocky structure; very firm, very sticky, very plastic; thick continuous prominent clay films on faces of peds; few fine roots; few dark oxide concretions; neutral; gradual smooth boundary.

B3—22 to 27 inches; olive (5Y 5/3) clay loam; common fine faint light olive brown (2.5Y 5/6), few fine prominent black (5Y 2/1), and few fine distinct white (10YR 8/1) mottles; weak medium angular blocky structure; firm, sticky, plastic; thin patchy distinct clay films on faces of peds; few fine roots; few fine flakes of mica; mildly alkaline; gradual wavy boundary.

Cr—27 to 60 inches; olive (5Y 5/3) saprolite that crushes to loam; few fine distinct white (10YR 8/1), few fine distinct greenish gray (5G 5/1), and few fine faint pale olive (5Y 6/3) mottles; massive; friable; few fine flakes of mica; mildly alkaline.

Solum thickness ranges from 23 to 33 inches. Depth to rippable rock is 20 to 40 inches. Reaction is slightly acid to moderately alkaline throughout except for the surface layer in unlimed areas.

The A horizon is 5 to 8 inches thick. It is dark brown, brown, dark grayish brown, or grayish brown fine sandy loam or loam.

The B2t horizon is 11 to 19 inches thick. It is light olive brown, olive brown, or yellowish brown and has mottles in shades of brown, yellow and black. The B3 horizon is 5 to 11 inches thick. It is light olive brown or olive sandy clay loam or clay loam and has mottles in shades of yellow, brown, and black.

The Cr horizon is finely mottled in shades of brown, black, yellow, olive, green, gray, and white. Some pedons are light olive brown or olive and have mottles in shades of gray, white, brown, black, and green. The Cr horizon is weathered saprolite that crushes to sandy loam, loam, or clay loam.

Iredell Variant

The Iredell Variant series consists of deep, poorly drained, slowly permeable soils that formed in material weathered from diorite, gabbro, hornblende schist, hornblende gneiss, and similar dark colored rocks. These nearly level soils are adjacent to small streams and in low-lying, flat areas. There are few to common dark colored concretions throughout the soil. Slopes range from 0 to 2 percent. These soils are similar to Iredell soils but are outside the range of the Iredell series mainly because of drainage and depth.

Iredell Variant soils are geographically closely associated with Iredell, Enon, and Mecklenburg soils. Iredell soils are better drained than Iredell Variant soils and have a thinner B2t horizon. Enon soils are better drained and have mixed mineralogy. Mecklenburg soils are better drained, have a redder B2t horizon, and have mixed mineralogy.

Typical pedon of Iredell Variant loam, 0 to 2 percent slopes, about 3 miles east of Calhoun Falls, about 1 mile east of junction of South Carolina Secondary Highways 32 and 78, about 1,700 feet northwest of South Carolina Secondary Highway 78, about 1,150 feet southeast of South Carolina Secondary Highway 32, and about 300 feet southeast of Clear Creek:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) loam; weak fine granular structure; very friable; many fine roots; few dark oxide concretions; slightly acid; clear smooth boundary.

B21t—8 to 18 inches; mottled gray (10YR 5/1) and light olive brown (2.5Y 5/4) clay; weak medium angular blocky structure; very firm, very sticky, very plastic; thick continuous prominent clay films on faces of peds; common fine roots; few dark oxide concretions; mildly alkaline; clear smooth boundary.

B22t—18 to 29 inches; very dark gray (5Y 3/1) clay; few fine distinct olive gray (5Y 4/2) mottles; weak medium angular blocky structure; very firm, very sticky, very plastic; thick continuous prominent clay films on faces of peds; few fine roots; few dark oxide concretions; mildly alkaline; clear smooth boundary.

B23t—29 to 38 inches; gray (5Y 5/1) clay; common coarse distinct very dark gray (N 3/0), common medium faint light olive gray (5Y 6/2), and few medium prominent light olive brown (2.5Y 5/4) mottles; weak medium angular blocky structure; very firm, very sticky, very plastic; thick continuous prominent clay films on faces of peds; few dark oxide concretions; few concretions of secondary lime; few pebbles of feldspar; few pebbles of quartz; mildly alkaline; clear smooth boundary.

B3—38 to 42 inches; mottled dark gray (N 4/0), light olive brown (2.5Y 5/6), and gray (5Y 6/1) clay loam; weak medium subangular blocky structure; firm sticky, plastic; thin patchy distinct clay films on faces of peds; few dark oxide concretions; common pebbles of feldspar; few pebbles of quartz; mildly alkaline; clear wavy boundary.

C—42 to 60 inches; mottled olive brown (2.5Y 4/4) and light olive brown (2.5Y 5/6) loam; common medium distinct olive (5Y 5/3) and few fine prominent white (10YR 8/1) mottles; massive; friable, slightly sticky, slightly plastic; few clay balls; many pebbles of feldspar; saprolite that crushes easily; mildly alkaline.

Solum thickness ranges from 40 to 52 inches. Depth to rippable rock is more than 40 inches. Reaction ranges from neutral to moderately alkaline throughout except for the surface layer in unlimed areas.

The A horizon is 6 to 8 inches thick and is loam or clay loam. It is very dark grayish brown, dark grayish brown, dark gray, or brown.

The B2t horizon is 22 to 38 inches thick and is very dark gray, dark gray, dark bluish gray, grayish green, greenish gray, or gray and has mottles in varying shades of olive, brown, gray, yellow, and white. The B2t horizon in some pedons is mottled gray, very dark gray, light olive brown, white, and strong brown. The B3 horizon is 4 to 16 inches thick. It is dark gray, dark greenish gray, greenish gray, pale olive, or dark bluish gray and has mottles in varying shades of brown, gray, green, olive, and white. The B3 horizon in some pedons is mottled dark gray, light olive brown, and gray. Texture of the B3 horizon is clay loam or sandy clay loam.

The C horizon is dark greenish gray, greenish gray, or dark bluish gray and has mottles in varying shades of brown, yellow, and olive. The C horizon in some pedons is mottled olive brown, light olive brown, olive, white, greenish gray, yellow, yellowish brown, and very pale brown. Texture of the C horizon is sandy loam, loam, clay loam, or sandy clay loam saprolite.

Madison series

The Madison series consists of deep, well drained, moderately permeable soils that formed in material weathered from quartz-mica-schist or mica-gneiss. These gently sloping to steep soils are on narrow to broad ridges and on side slopes. Slopes range from 2 to 40 percent.

Madison soils are geographically closely associated with Appling, Cataula, Cecil, Hiwassee, Pacolet, and Wilkes soils. Appling soils, which are on slightly lower, convex ridges, have a browner Bt horizon. Cataula, Cecil, and Pacolet soils do not have a micaceous Bt horizon. Hiwassee soils have a dark red Bt horizon. Wilkes soils have a solum less than 20 inches thick.

Typical pedon of Madison sandy loam, from an area of Madison sandy loam, 2 to 6 percent slopes, about 4.5 miles northeast of Antreville, about 5 miles northwest of Due West, about 1 mile north of Level Land, about 0.5 mile northeast of South Carolina Highway 201, and about 50 feet north of unnumbered dirt road:

Ap—0 to 5 inches; brown (10YR 5/3) sandy loam; weak fine granular structure; very friable; many fine roots; few fine flakes of mica; strongly acid; abrupt smooth boundary.

B21t—5 to 13 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; thin patchy distinct clay films on faces of peds; few fine roots; many fine flakes of mica; strongly acid; gradual smooth boundary.

B22t—13 to 24 inches; red (2.5YR 4/8) clay; few medium prominent brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm, sticky, slightly plastic; thin patchy distinct clay films on faces of peds; many fine flakes of mica; very strongly acid; gradual wavy boundary.

B3—24 to 37 inches; red (2.5YR 5/8) clay loam; common medium prominent brownish yellow (10YR 6/6) and common medium distinct very pale brown (10YR 7/3) mottles; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; thin patchy faint clay films on faces of some peds; many fine and medium flakes of mica; few fragments of feldspar and mica-schist; strongly acid; gradual wavy boundary.

C—37 to 60 inches; mottled red, yellowish brown, strong brown, very pale brown, and gray sandy clay loam; massive; friable; many fine and medium flakes of mica; few fragments of feldspar; many fragments of mica-schist; saprolite that crushes easily; very strongly acid.

Solum thickness ranges from 27 to 40 inches. Depth to hard rock is more than 60 inches. Reaction is very strongly acid or strongly acid throughout except for the surface layer in limed areas. There are few to many flakes of mica in the upper part of the solum and common or many flakes of mica in the lower part.

The A horizon ranges from 4 to 7 inches in thickness. It is brown, grayish brown, or yellowish brown.

The B1 horizon, where present, is about 3 to 6 inches thick. It is yellowish red or reddish brown sandy clay loam. The B2t horizon ranges from 12 to 26 inches in thickness. It is red or yellowish red. Some pedons have yellow, red, and brown mottles in the lower part of the B2t horizon. The texture is clay or clay loam. The B3 horizon ranges from 6 to 15 inches in thickness. It is red or yellowish red and has red, yellow, and brown mottles. The texture is clay loam or sandy clay loam.

The C horizon is red, light red, reddish yellow, or brownish yellow and has common to many mottles in shades of red, yellow, brown, white, and pink. Some pedons are mottled in shades of red, pink, brown, yellow, and white. The C horizon is loam, sandy loam, or sandy clay loam saprolite. Fragments of quartz-mica-schist are common in some pedons.

Mecklenburg series

The Mecklenburg series consists of deep, well drained, slowly permeable soils that formed in material weathered from diorite, gabbro, hornblende gneiss, hornblende schist, and similar dark colored rocks. These gently sloping to strongly sloping soils are on narrow and broad ridges adjacent to drainageways. Slopes range from 2 to 15 percent.

Mecklenburg soils are geographically closely associated with Davidson, Enon, Hiwassee, Iredell, Iredell Variant, and Wilkes soils. Davidson and Hiwassee soils have a dark red B2t horizon. Enon and Iredell soils have a yellower B2t horizon. Iredell Variant soils have a gray B2t horizon. Wilkes soils have a thinner Bt horizon.

Typical pedon of Mecklenburg sandy loam, 2 to 6 percent slopes, about 3.5 miles northeast of Calhoun Falls, about 7.5 miles southeast of Lowndesville, about 2 miles east of junction of South Carolina Highway 81 and South Carolina Secondary Highway 344, about 500 feet west of South Carolina Secondary Highway 344, about 1,100 feet northeast of Gill Creek, and about 175 feet west of field road:

Ap—0 to 6 inches; reddish brown (5YR 4/3) sandy loam; weak fine granular structure; very friable; many fine roots, few medium roots; few fine dark oxide concretions; few fine to coarse pebbles of angular quartz; slightly acid; abrupt smooth boundary.

B21t—6 to 23 inches; yellowish red (5YR 4/6) clay; moderate medium subangular blocky structure; firm, sticky, plastic; thin continuous prominent clay films on faces of peds; few fine roots; few fine dark oxide concretions; few fine to coarse pebbles of angular quartz; slightly acid; gradual wavy boundary.

B22t—23 to 33 inches; yellowish red (5YR 5/8) clay; common medium faint reddish brown (5YR 4/4) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; thin continuous prominent clay films on faces of peds; few fine dark oxide concretions; slightly acid; gradual wavy boundary.

B3—33 to 44 inches; reddish yellow (5YR 6/8) clay loam; common medium prominent yellow (10YR 7/8) mottles; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; thin patchy distinct clay films on faces of peds; slightly acid; gradual wavy boundary.

Cr—44 to 63 inches; strong brown (7.5YR 5/6) saprolite that crushes to loam; common medium prominent yellow (10YR 7/8) and few medium distinct yellowish red (5YR 4/8) mottles; massive; friable, slightly sticky, slightly plastic; slightly acid.

Solum thickness ranges from 22 to 58 inches. Depth to hard rock is more than 60 inches. Reaction is medium acid to neutral throughout. Base saturation in the C horizon is 35 to 60 percent. Dark oxide concretions are few or common throughout the soil.

The A horizon is 4 to 12 inches thick. It is dark brown, brown, reddish brown, or dark grayish brown sandy loam or clay loam.

The B2t horizon is 12 to 34 inches thick. It is red, yellowish red, or reddish brown and has mottles in shades of brown, yellow, and red. The B3 horizon is 5 to 24 inches thick. It is brownish yellow, yellowish red, reddish brown, light yellowish brown, strong brown, reddish yellow, or red and has mottles of white, yellow, brown, olive, and red. It is clay loam, sandy clay loam, or sandy loam.

The Cr horizon is brownish yellow, yellowish red, reddish yellow, or strong brown and has mottles in shades of white, red, brown, yellow, and gray. Some pedons are mottled brown, yellow, red, green, and gray. The Cr horizon is saprolite that crushes to loam, sandy loam, or clay loam.

These soils have a slightly thicker solum than is defined in the range for the series, but this difference does not significantly alter their usefulness and behavior.

Pacolet series

The Pacolet series consists of soils that are moderately deep over saprolite. These soils are well drained and moderately permeable and formed in material weathered from granite, gneiss, and schist. These strongly sloping to steep soils are on slopes adjacent to streams. Slopes range from 10 to 40 percent.

Pacolet soils are geographically closely associated with Cecil, Enon, Hiwassee, Madison, and Wilkes soils. Cecil soils have a thicker B2t horizon. Enon soils have base saturation of more than 35 percent. Hiwassee soils have a

dark red B2t horizon. Madison soils have a micaceous B2t horizon. Wilkes soils have a solum less than 20 inches thick.

Typical pedon of Pacolet sandy loam, 15 to 40 percent slopes, about 3.13 miles north of Due West, about 3 miles west of Donalds, about 0.75 mile southwest of junction of South Carolina Secondary Highways 288 and 112, about 340 feet south of South Carolina Secondary Highway 112, and about 350 feet east of Hogskin Creek:

Ap—0 to 7 inches; brown (10YR 5/3) sandy loam; weak fine granular structure; very friable; common fine roots; few pebbles of quartz 5 to 25 mm in diameter; medium acid; abrupt smooth boundary.

B2t—7 to 19 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm; thin continuous distinct clay films on faces of peds; few fine roots; few fine flakes of mica; few weathered fragments of feldspar; strongly acid; gradual wavy boundary.

B3—19 to 31 inches; red (2.5YR 4/8) clay loam; weak medium subangular blocky structure; firm; thin patchy faint clay films on faces of peds; few fine roots; common fine flakes of mica; common weathered fragments of feldspar; medium acid; gradual wavy boundary.

Cr—31 to 60 inches; red (2.5YR 5/8) saprolite that crushes to loam; friable; common fine flakes of mica; common weathered fragments of feldspar; medium acid.

Solum thickness ranges from 24 to 39 inches. Depth to hard rock is more than 60 inches. Reaction is medium acid to very strongly acid throughout except for the surface layer in limed areas.

The A horizon is brown or yellowish brown and is 5 to 7 inches thick. In eroded areas, the A horizon is yellowish red sandy clay loam or clay loam 2 to 3 inches thick.

The B1 horizon, where present, is 3 to 4 inches thick and is red or yellowish red clay loam. The B2t horizon is 9 to 29 inches thick. Some pedons have brown or yellow mottles in the lower part of the B2t horizon. The B3 horizon is 5 to 19 inches thick. It is red or yellowish red clay loam or sandy clay loam and has mottles of yellow, red, and brown.

The C horizon is red, reddish yellow, or yellowish red and has mottles of yellow, red, and brown. Some pedons are mottled red, yellow, brown, white, and pink. The C horizon is sandy loam, loam, sandy clay loam, or clay loam saprolite.

Toccoa series

The Toccoa series consists of well drained, moderately rapidly permeable soils. These soils formed in dominantly loamy alluvial sediments along flood plains of the streams. They are subject to common flooding for short periods. These nearly level, deep soils are on long, narrow first bottoms of the Piedmont Plateau. Slopes are dominantly less than 1 percent but range to as much as 2 percent.

Toccoa soils are geographically closely associated with Buncombe and Chewacla soils. Buncombe soils, which are on slightly higher adjacent slopes, are more sandy throughout the control section. Chewacla soils, which are on slightly lower adjacent slopes, have a fine-loamy control section.

Typical pedon of Toccoa sandy loam, about 1.5 miles north of Lowndesville and about 8 miles southwest of Antreville, about 1.5 miles south of junction of South Carolina Primary Highway 81 and South Carolina Secondary Highway 125, about 150 feet east of South Carolina Primary Highway 81, and about 150 feet north of Charles Creek:

Ap—0 to 5 inches; dark brown (7.5YR 4/4) sandy loam; weak fine granular structure; very friable; many fine roots; many fine flakes of mica; neutral; abrupt smooth boundary.

C1—5 to 21 inches; yellowish red (5YR 5/8) sandy loam; massive; very friable; few fine roots; many fine flakes of mica; thin bedding planes with textures of silt loam; slightly acid; clear smooth boundary.

C2—21 to 30 inches; yellowish red (5YR 5/8) sandy loam; massive; very friable; many fine flakes of mica; thin bedding planes with textures of sand; medium acid; clear smooth boundary.

C3—30 to 39 inches; yellowish red (5YR 5/8) loamy sand; few medium distinct reddish yellow (7.5YR 6/8) and few medium prominent dark brown (7.5YR 3/2) mottles; single grained; loose; many fine flakes of mica; thin bedding planes with textures of sandy loam and silt loam; few pebbles ranging in diameter from 2 to 20 mm; medium acid; clear smooth boundary.

C4—39 to 51 inches; mottled pale brown (10YR 6/3), yellowish red (5YR 5/8), and reddish yellow (7.5YR 7/6) fine sandy loam; massive; very friable; many fine flakes of mica; thin bedding planes with textures of silt loam; medium acid; clear smooth boundary.

C5—51 to 65 inches; brown (10YR 5/3) silt loam; common fine distinct yellowish red (5YR 5/6) and few fine faint grayish brown (10YR 5/2) mottles; massive; very friable; common fine flakes of mica; thin bedding planes with textures of sandy loam; few black charcoal pieces; medium acid.

Reaction is strongly acid to slightly acid throughout except for the surface layer in limed areas. Thin bedding planes of different textures are evident throughout the C horizon. There are few to many fine flakes of mica in all horizons. Depth to hard rock is more than 60 inches.

The A horizon is brown, dark brown, or reddish brown fine sandy loam, sandy loam, or loam 5 to 9 inches thick.

The C horizon is reddish brown, brown, dark yellowish brown, yellowish red, or reddish yellow and has few to common mottles in shades of yellow, brown, and red. Some pedons are gray in the lower part of the C horizon and have brown mottles; some pedons are mottled in the lower part in shades of brown, yellow, red, and gray. The C horizon is loamy sand, fine sandy loam, sandy loam, or loam.

Wilkes series

The Wilkes series consists of soils that are shallow over saprolite. These soils are well drained and moderately slowly permeable and formed in material weathered from diorite, gabbro, hornblende gneiss, or hornblende schist. These sloping to steep soils are on side slopes adjacent to streams. Slopes range from 6 to 40 percent.

Wilkes soils are geographically closely associated with Enon, Madison, Mecklenburg, and Pacolet soils. Enon and Mecklenburg soils have a thicker solum and have mixed mineralogy. Madison and Pacolet soils have a thicker solum and a redder B2t horizon.

Typical pedon of Wilkes sandy loam, 15 to 40 percent slopes, about 7 miles east of Abbeville, 225 feet south of South Carolina Highway 72, and about 200 feet east of Little Curltail Creek:

Ap—0 to 7 inches; brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; many fine and few medium roots; few fine dark oxide concretions; medium acid; abrupt smooth boundary.

B2t—7 to 12 inches; yellowish brown (10YR 5/4) sandy clay loam; common coarse distinct light olive brown (2.5Y 5/4) and common medium faint brownish yellow (10YR 6/8) mottles, and common fine prominent black (10YR 2/1) streaks; weak coarse angular blocky structure; firm, sticky, plastic; thin patchy distinct clay films on faces of most peds; few fine roots; few fine dark oxide concretions; few medium fragments of feldspar; medium acid; gradual wavy boundary.

B3—12 to 16 inches; light olive brown (2.5Y 5/4) sandy clay loam; common medium faint pale brown (10YR 6/3) and few fine distinct light gray (10YR 7/2) mottles, and common fine prominent black (10YR 2/1) streaks; weak medium angular blocky structure; firm, slightly sticky, slightly plastic; thin patchy faint clay films on faces of some peds; few fine roots; few medium fragments of feldspar; slightly acid; gradual wavy boundary.

Cr—16 to 44 inches; yellowish brown (10YR 5/4) saprolite that crushes to loam; many fine prominent black (10YR 2/1) streaks, and few fine distinct pale brown (10YR 6/3) mottles; rock-controlled cleavage planes; neutral.

Solum thickness ranges from 13 to 16 inches. Depth to hard rock is 40 to 80 inches. Reaction is slightly acid to mildly alkaline throughout except in the surface layer in unlimed areas.

The Ap horizon is 5 to 7 inches thick and is brown or grayish brown. The A1 horizon is 2 to 6 inches thick. It is very dark grayish brown or grayish brown sandy loam. The A2 horizon is 3 to 8 inches thick. It is yellowish brown or light yellowish brown loam or sandy loam.

The B2t horizon is 3 to 6 inches thick. It is strong brown or yellowish brown clay, clay loam, or sandy clay loam. In some pedons, the B2t horizon has black, brown, olive, and yellow mottles. The B3 horizon is 3 to 6 inches thick. It is strong brown, brownish yellow, yellowish brown, or light olive brown clay loam, or sandy clay loam and has mottles in shades of brown, yellow, olive, gray, black, and red.

The Cr horizon is mottled brown, olive, green, gray, yellow, black, red, and white saprolite that crushes to sandy loam or loam.

Classification of the soils

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to "Soil taxonomy" (*7*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 19, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Hapludults (*Hapl*, meaning simple horizons, plus *udult*, the suborder of Ultisols that have a udic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceeding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is clayey, kaolinitic, thermic Typic Hapludults.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

Formation of the soils

In this section, the factors of soil formation and the processes of soil horizon differentiation are described.

Factors of soil formation

Soil is the natural medium in which plants grow. It is the product of soil-forming processes acting on accumulated or deposited geologic materials. The five important factors in soil formation are parent material, climate, living organisms (plants and animals), relief, and time.

Climate and living organisms are the active forces of soil formation. Their effect on the parent material is modified by relief and by the length of time the parent material has been in place. The relative importance of each factor differs from place to place. In some places one factor dominates in the formation and fixes most of the

properties of the soil formed, but normally the interaction of all five factors determines what kind of soil is formed at any given place.

Although soil formation is complex, some understanding of the soil-forming processes may be gained by considering each of the five factors separately. Each of the five factors, however, is affected by and also affects each of the other factors.

Parent material

Parent material is the unconsolidated mass from which a soil is formed. It has much to do with the mineral and chemical composition of the soils. In Abbeville County the parent material was derived from two sources, residuum from the parent rocks and alluvium deposited by streams.

Residual parent material is formed in place through the weathering of the underlying rock. Soils formed in this material occupy about 94 percent of the county. For the most part, the rocks of Abbeville County are (1) partly granitized mica gneiss; (2) hornblende gneiss; (3) mica schist; (4) massive or weakly foliated granite; and (5) gabbro and diorite cut by dikes, or intrusions, of minor rock.

The mica gneiss contains deeply weathered minerals of quartz, feldspar, and mica. The chief minerals in hornblende gneiss are quartz, feldspar, and hornblende, but in places this rock contains variable amounts of biotite mica and chlorite. The thick layers of residuum consist of clay mixed with fragments of gneiss and with quartz and mica. Cecil and Cataula soils formed from this kind of parent material.

Granite is massive or weakly foliated. It is an intrusion into the gneiss and schist. In general, granite consists of quartz, orthoclase and plagioclase feldspar, biotite and muscovite mica, and vermiculite and other accessory minerals in variable amounts. In Abbeville County the soils derived from weathered granite are in the Appling and Durham series.

Gabbro and diorite rocks are coarse textured (*4*), distinctly massive, and not closely jointed. They consist chiefly of hornblende, pyroxene, and plagioclase feldspar and varying amounts of quartz and other accessory minerals. Gabbro and diorite weather at a moderate rate, while the intrusions weather slowly. In some places flat rocks showing little or no weathering crop out, but in most places the rocks are deeply weathered and are covered with a thick layer of soil. Enon, Mecklenburg, and Iredell soils are derived from these rocks.

In Abbeville County recent alluvium consists of a mixture of gravel, sand, silt, and clay. Much of this alluvium weathered from rocks in the uplands nearby, but some weathered from granite and metamorphosed rocks of the Piedmont Plateau and of the mountains farther north. The soils that formed in recent alluvium are on the bottom lands. The soils on bottoms are weakly developed and still receive deposits during floods. In this county Buncombe, Chewacla, and Toccoa soils formed in recent alluvium.

Climate

The climate of Abbeville County is important in the formation of soils. The county has a temperate climate, and rainfall is well distributed throughout the year. Temperature and precipitation data are given under the heading "Climate" in the section "General nature of the county."

Climate, particularly precipitation and temperature, affects the physical, chemical, and biological relationships in the soil. Water dissolves minerals, aids chemical and biological activity, and transports the dissolved mineral and organic material through the soil profile. Large amounts of rainwater promote leaching of the soluble bases and the translocation of the less soluble and colloidal material downward through the soil profile. A long frost-free season and high rainfall result in the downward movement of fine-textured soil material and the loss of plant nutrients.

The amount of water that percolates through the soil depends on the amount of rainfall, the relative humidity, and the length of the frost-free season. Percolation, or the downward movement of water, also is affected by relief, or lay of the land, and by permeability of the soil material. Weathering of the parent material is intensified if the percolation is interrupted only by brief periods of shallow freezing. A high average temperature, therefore, speeds weathering and increases the number and kinds of living organisms in the soil. The organisms, in turn, affect soil formation.

Living organisms

The number and kinds of plants and animals that live in and on the soil are determined mainly by the climate but, to lesser extent, by parent material, relief, and age of the soil.

Bacteria, fungi, and other micro-organisms are indispensable in soil formation. They hasten the weathering of minerals and the decomposition of organic matter. Larger plants alter the soil microclimate, furnish organic matter, and transfer chemical elements from the subsoil to the surface soil.

Most of the fungi, bacteria, and other micro-organisms in the soils of Abbeville County are in the upper few inches of the soil. Earthworms and other small invertebrates are active chiefly in the A horizon and in the upper part of the B horizon, where they slowly but continuously mix the soil material. Bacteria and fungi decompose organic matter and release nutrients for plant use. Other animals play a secondary role in soil formation, but their influence is great. By eating plants they perform one step in returning plant material to the soil.

In Abbeville County the native vegetation in the uplands was chiefly loblolly pine, shortleaf pine, oak, and hickory. In the bottom land it was mainly sweetgum, black gum, yellow-popular, maple, tupelo, and ash. Large trees affect soil formation by bringing nutrients up from deep in the soil, by bringing soil material up from varying

depths when blown over, and by providing large openings to be filled by material from above as large roots decay.

Relief

Relief, or lay of the land, influences soil formation because of its effect on moisture, temperature, and erosion. This influence, however, is modified somewhat by the influence of the other soil-forming factors.

In Abbeville County, slopes range from 0 to 40 percent. Most soils on uplands that have slopes of less than 15 percent have a thick, well-developed profile. Where slopes are 15 to 40 percent, the soils have a thinner, less developed profile. In Abbeville County, however, the most extensive soils are gently sloping to strongly sloping and have not been adversely affected by relief.

On stream bottoms the slopes range from 0 to about 4 percent. Here, the soils are young because the parent material has been in place for a relatively short time.

Time

Time is necessary in the formation of soils. The length of time required for a soil to develop depends largely on the intensity of other soil-forming factors. The soils in Abbeville County range from immature, or young, to mature. The young soils have very little profile development, and the mature soils have well-defined horizons.

On the smoother parts of the uplands, the soils have generally developed to maturity. Examples of these mature soils are Cecil soils. On the stronger slopes, geologic erosion has removed the soil material to some extent. Consequently, the soils on these slopes are shallower. Examples are Pacolet and Wilkes soils. On the first bottoms of streams, the soils are young because the material has not been in place long enough for soil horizons to form. Toccoa soils are examples of young soils.

Processes of soil horizon differentiation

If a vertical cut is dug into a soil, several layers, or horizons, are evident. The differentiation of horizons is the result of many soil forming processes. These include the accumulation of organic matter, the leaching of soluble salts, reduction and translocation of iron, the formation of soil structure, physical weathering, such as freezing and thawing, and chemical weathering of primary minerals or rocks.

Some of these processes are continually taking place in all soils, but the number of active processes and the degree of their activity vary from one soil to another.

Most soils have three major horizons, called A, B, and C horizons (*5*). These major horizons can be further subdivided through the use of subscripts and letters to indicate changes within one horizon. An example is the B2t horizon, which represents a layer within the B horizon in which translocated clay has illuviated from the A horizon.

The A horizon is the surface layer. The layer with the largest accumulation of organic matter is called an A1 horizon. If the soils are cleared and plowed, the surface layer becomes an Ap horizon. The A horizon is also the layer of maximum leaching or eluviation of clay and iron. When considerable leaching has taken place, an A2 horizon is formed just below the surface layer. Normally, it is the lightest colored horizon in the soil. It is well expressed in such soils as Appling and Durham soils.

The B horizon is beneath the A horizon and is commonly called the subsoil. It is the horizon of maximum accumulation, or illuviation of clay, iron, aluminum, or other compounds, leached from the A horizon. Cecil, Hiwassee, and Madison soils are among the soils that have a well-expressed B horizon.

The C horizon is below the A and B horizons. Some soils, such as Buncombe and Toccoa soils, do not have a B horizon, and the C horizon is immediately below the A horizon. The C horizon consists of materials that are little altered by the soil-forming processes but that can be modified by weathering.

Some soils, such as Cataula soils, have a fragipan below the B horizon, generally 15 to 36 inches below the surface. This horizon is very low in organic-matter content. It is seemingly cemented and is hard or very hard when dry and brittle when moist. The fragipan is generally mottled, is slowly or very slowly permeable, and generally has few or many bleached fracture planes that form polygons.

Soils in Abbeville County that are well drained have a yellowish brown or reddish subsoil. These colors are the result of a thin coating of iron oxide on the sand, silt, and clay particles. A soil is considered well drained if it is free of gray (chroma of 2 or less) mottles to a depth of at least 30 inches. Most of the soils in Abbeville County are well drained.

Soils that are moderately well drained are generally free of gray (chroma of 2 or less) mottles to a depth of about 15 to 20 inches. Helena soils are moderately well drained.

Soils that are somewhat poorly drained have gray mottles near the A horizon. Chewacla soils are somewhat poorly drained.

Soils that are poorly drained are usually dominantly gray below the A horizon, and some are mottled. Some poorly drained soils have a gray A horizon. Iredell Variant soils are poorly drained.

Soils that are excessively drained are usually brownish, yellowish or reddish and are free of gray (chroma of 2 or less) mottles. They are porous and usually sandy. Buncombe soils are excessively drained.

References

(1) American Association of State Highway Officials. 1970. Standard specifications for highway materials and methods of sampling and testing. Ed. 10, 2 vol., illus.

(2) American Society for Testing and Materials. 1974. Method for classification of soils for engineering purposes. ASTM Stand. D 2487-69. *In* 1974 Annual Book of ASTM Standards, Part 19, 464 pp., illus.

(3) Bryan, John M. 1975. Abbeville, South Carolina: a plan for its preservation. 51 pp.

(4) Overstreet, William C. and Henry Bell, III. 1965. The crystalline rocks of South Carolina. U.S. Dep. Int., Geol. Surv. Bull. 1183, 126 pp., illus.
(5) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. [Supplements replacing pp. 173-188 issued May 1962]
(6) United States Department of Agriculture. 1970. South Carolina soil and water conservation needs inventory. U.S. Dep. Agric., Soil Conserv. Serv., 71 pp.
(7) United States Department of Agriculture. 1975. Soil taxonomy: a basic system of soil classification for making and interpreting soil surveys. U.S. Dep. Agric. Handb. 436, 754 pp., illus.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim. An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single mapping unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	More than 9

Base saturation. The degree to which material having base exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to frequent flooding.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Coarse fragments. Mineral or rock particles up to 3 inches (2 millimeters to 7.5 centimeters) in diameter.

Coarse textured (light textured) soil. Sand or loamy sand.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures is difficult.

Compressible. Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is 40 or 80 inches (1 or 2 meters).

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Depth to rock. Bedrock at a depth that adversely affects the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but

periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake. The rapid movement of water into the soil.

Favorable. Favorable soil features for the specified use.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured (heavy textured) soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; *November-May,* for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives, as opposed to the range or geographical distribution.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered, but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. Inadequate strength for supporting loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Moderately coarse textured (moderately light textured) soil. Sandy loam and fine sandy loam.

Moderately fine textured (moderately heavy textured) soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three single variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characteristic that affects management. These differencees are too small to justify separate series.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Poorly graded. Refers to soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity (soil). The capability of a soil for producing a specified plant or sequence of plants under a specified system of management. Productivity is measured in terms of output, or harvest, in relation to input.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulates over disintegrating rock.

Rooting depth. Shallow root zone. The soil is shallow over a layer that greatly restricts roots. See Root zone.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Saprolite (geology). Soft, earthy, clay-rich, thoroughly decomposed rock formed in place by chemical weathering of igneous and metamorphic rock. In soil survey, the term saprolite is applied to any unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake. The slow movement of water into the soil.

Slow refill. The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones. Rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Small stones adversely affect the specified use.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.005 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use or management.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or " very fine."

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but the limited geographic soil area does not justify creation of a new series.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to a soil or soil material consisting of particles well distributed over a wide range in size or diameter. Such a soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Illustrations

Figure 1.—Cattle grazing a pasture of fescue on Cataula sandy loam, 2 to 6 percent slopes.

Figure 2.—Fescue pasture on Cecil sandy loam, 6 to 10 percent slopes. Fescue is well suited to this soil.

Figure 3.—A good stand of loblolly pine on Cecil sandy loam, 2 to 6 percent slopes.

Figure 4.—Wheat on Hiwassee sandy loam, 2 to 6 percent slopes. Wheat is well suited to this soil.

Figure 5.—Profile of Hiwassee sandy loam, 6 to 10 percent slopes. Note that the fescue roots penetrate the firm subsoil.

Figure 6.—Cotton on Iredell fine sandy loam, 2 to 6 percent slopes. Cotton is well suited to this soil.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

[Recorded in the period 1951-74 at Calhoun Falls, S.C.]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	F	F	F	F	F	Units	In	In	In		In
January----	54.0	30.9	42.5	74	10	34	4.72	3.00	6.26	8	0.5
February---	57.0	32.0	44.5	76	12	37	4.15	2.67	5.49	7	.6
March------	64.6	38.2	51.5	84	21	144	5.23	3.39	6.90	8	.4
April------	74.7	47.5	61.1	90	30	333	4.21	2.76	5.52	6	0
May--------	82.1	56.3	69.2	95	38	595	3.98	1.97	5.62	6	0
June-------	88.0	63.9	75.9	100	50	777	4.22	2.59	5.67	7	0
July-------	90.8	67.4	79.1	100	56	902	4.75	2.68	6.43	8	0
August-----	90.4	67.0	78.7	99	57	890	3.51	2.03	4.71	6	0
September--	84.8	61.1	73.0	97	45	690	3.54	1.35	5.30	5	0
October----	75.8	48.4	62.1	91	28	375	2.55	.76	3.98	4	0
November---	65.5	37.6	51.5	84	19	99	2.91	1.41	4.13	5	.1
December---	56.3	31.9	44.1	77	12	49	4.06	2.27	5.52	7	.4
Year-----	73.7	48.5	61.1	102	7	4,925	47.83	40.25	55.08	77	2.0

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-74 at Calhoun Falls, S.C.]

Probability	Temperature		
	24 F or lower	28 F or lower	32 F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 24	April 4	April 19
2 years in 10 later than--	March 17	March 29	April 14
5 years in 10 later than--	March 4	March 17	April 6
First freezing temperature in fall:			
1 year in 10 earlier than--	November 5	October 26	October 19
2 years in 10 earlier than--	November 11	October 31	October 24
5 years in 10 earlier than--	November 22	November 10	November 2

TABLE 3.--GROWING SEASON LENGTH

[Recorded in the period 1951-74 at Calhoun Falls, S.C.]

Probability	Daily minimum temperature during growing season		
	Higher than 24 F	Higher than 28 F	Higher than 32 F
	Days	Days	Days
9 years in 10	235	219	193
8 years in 10	245	226	198
5 years in 10	263	237	209
2 years in 10	280	249	220
1 year in 10	290	256	225

TABLE 4.--POTENTIALS AND LIMITATIONS OF MAP UNITS ON THE GENERAL SOIL MAP FOR SPECIFIED USES

[Potentials of the different soils in each unit vary widely; potentials of each unit are based on the acreage of each soil and on the severity of its limitations]

Map unit	Extent of area	Cultivated crops	Pasture	Woodland	Urban uses	Recreation areas
	Pct					
1. Toccoa-Chewacla	6	High: floods.	High: floods.	High: floods.	Low: floods, wetness.	Low: floods, wetness.
2. Pacolet-Wilkes	26	Low: slope.	Low: slope.	Medium: slope.	Low: slope.	Medium: slope.
3. Cecil-Cataula-Hiwassee.	37	Medium: slope.	High: slope.	High	High: slope.	High: slope.
4. Cecil-Cataula-Appling.	14	Medium: slope.	High: slope.	High	High: slope.	High: slope.
5. Mecklenburg-Davidson-Iredell.	9	Medium: slope.	High: slope.	High	Low: low strength, percs slowly.	Medium: too clayey, percs slowly.
6. Cecil-Hiwassee-Mecklenburg.	8	Medium: slope.	High: slope.	High	High: slope, percs slowly.	High: slope.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
ApB	Appling sandy loam, 2 to 6 percent slopes	8,839	2.7
ApC	Appling sandy loam, 6 to 10 percent slopes	2,206	0.7
BuB	Buncombe sand, 0 to 4 percent slopes	628	0.2
CaB	Cataula sandy loam, 2 to 6 percent slopes	20,915	6.5
CaC	Cataula sandy loam, 6 to 10 percent slopes	12,442	3.8
CbC2	Cataula sandy clay loam, 6 to 10 percent slopes, eroded	2,973	0.9
CcB	Cecil sandy loam, 2 to 6 percent slopes	42,008	13.1
CcC	Cecil sandy loam, 6 to 10 percent slopes	30,576	9.4
CcD	Cecil sandy loam, 10 to 15 percent slopes	22,412	6.9
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, eroded	1,164	0.4
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, eroded	3,350	1.0
Ch	Chewacla loam	7,167	2.2
DaB	Davidson loam, 2 to 6 percent slopes	5,713	1.8
DaC	Davidson loam, 6 to 10 percent slopes	2,277	0.7
DuB	Durham loamy sand, 2 to 6 percent slopes	762	0.2
EnB	Enon sandy loam, 2 to 6 percent slopes	2,639	0.8
EnC	Enon sandy loam, 6 to 10 percent slopes	3,525	1.1
EnD	Enon sandy loam, 10 to 15 percent slopes	3,175	1.0
EnE	Enon sandy loam, 15 to 25 percent slopes	440	0.1
HeB	Helena sandy loam, 2 to 6 percent slopes	2,289	0.7
HsB	Hiwassee sandy loam, 2 to 6 percent slopes	13,105	4.0
HsC	Hiwassee sandy loam, 6 to 10 percent slopes	9,350	2.9
HsD	Hiwassee sandy loam, 10 to 15 percent slopes	6,210	1.9
HwC2	Hiwassee clay loam, 6 to 10 percent slopes, eroded	2,070	0.6
HwD2	Hiwassee clay loam, 10 to 15 percent slopes, eroded	694	0.2
IdB	Iredell fine sandy loam, 2 to 6 percent slopes	5,160	1.6
IvA	Iredell Variant loam, 0 to 2 percent slopes	1,484	0.5
MaB	Madison sandy loam, 2 to 6 percent slopes	1,394	0.4
MaC	Madison sandy loam, 6 to 10 percent slopes	1,703	0.5
MaD	Madison sandy loam, 10 to 15 percent slopes	898	0.3
MaF	Madison sandy loam, 15 to 40 percent slopes	968	0.3
MeB	Mecklenburg sandy loam, 2 to 6 percent slopes	12,441	3.8
MeC	Mecklenburg sandy loam, 6 to 10 percent slopes	10,799	3.3
MeD	Mecklenburg sandy loam, 10 to 15 percent slopes	5,140	1.6
PaF	Pacolet sandy loam, 15 to 40 percent slopes	44,063	13.7
PcE3	Pacolet clay loam, 10 to 25 percent slopes, gullied	7,432	2.3
Tc	Toccoa sandy loam	12,966	4.0
WkD	Wilkes sandy loam, 6 to 15 percent slopes	3,573	1.1
WkF	Wilkes sandy loam, 15 to 40 percent slopes	7,886	2.4
	Water	1,164	0.4
	Total	324,000	100.0

TABLE 6.--YIELDS PER ACRE OF PASTURE AND HAY CROPS

[All yields were estimated for a high level of management in 1975. Absence of a yield figure indicates the crop is seldom grown or is not suited]

Soil name and map symbol	Tall fescue	Common bermudagrass	Bahiagrass	Sorghums	Small grains	Sericea lespedeza	Improved bermudagrass
	AUM[1]	AUM[1]	AUM[1]	AUM[1]	AUM[1]	Tons	Tons
Appling:							
ApB	7.0	7.0	7.0	9.5	6.0	3.0	4.2
ApC	6.5	6.5	6.5	9.0	5.5	2.5	4.0
Buncombe:							
BuB	3.5	6.0	6.0	7.0	4.0	1.0	3.6
Cataula:							
CaB, CaC	6.5	6.5	6.5	9.0	6.0	3.0	4.0
CbC2	6.0	6.0	6.0	8.5	5.5	2.5	3.6
Cecil:							
CcB	7.0	7.0	7.0	9.5	6.0	3.0	4.2
CcC	6.5	6.5	6.5	9.0	5.5	2.5	4.0
CcD	6.0	6.0	6.0	8.5	5.0	2.0	3.6
CeB2	6.0	6.0	6.5	8.5	5.5	2.5	3.6
CeC2	5.5	5.5	6.0	8.0	5.0	2.0	3.0
Chewacla:							
Ch	9.0	6.0	6.0	10.0	6.5	---	3.0
Davidson:							
DaB	7.0	7.0	7.0	9.5	6.0	3.0	4.0
DaC	6.0	6.0	6.0	8.0	5.5	2.5	3.6
Durham:							
DuB	6.5	7.0	7.0	9.5	6.0	3.0	4.0
Enon:							
EnB	6.5	6.5	6.5	9.0	5.5	2.5	3.6
EnC	6.0	6.0	6.0	8.5	5.0	2.0	3.4
EnD	5.5	5.5	5.5	8.0	4.5	1.5	3.0
EnE	5.0	5.0	5.0	---	---	---	---
Helena:							
HeB	6.5	7.0	7.0	9.5	6.0	3.0	3.8
Hiwassee:							
HsB	7.0	7.0	7.0	9.5	6.0	3.0	3.8
HsC	6.0	6.0	6.0	8.0	5.5	2.5	3.6
HsD	5.5	5.5	5.5	7.5	4.5	2.0	3.4
HwC2	5.0	5.0	5.0	7.0	4.0	1.5	3.0
HwD2	4.5	4.5	4.5	6.5	3.5	1.0	2.5
Iredell:							
IdB	7.0	7.0	7.0	9.0	6.5	2.0	4.2
Iredell Variant:							
IvA	6.5	6.0	6.0	8.0	6.0	1.0	3.8

See footnote at end of table.

TABLE 6.--YIELDS PER ACRE OF PASTURE AND HAY CROPS--Continued

Soil name and map symbol	Tall fescue	Common bermuda-grass	Bahiagrass	Sorghums	Small grains	Sericea lespedeza	Improved bermudagrass
	AUM[1]	AUM[1]	AUM[1]	AUM[1]	AUM[1]	Tons	Tons
Madison:							
MaB	7.0	7.0	7.0	9.5	6.0	3.0	3.8
MaC	6.5	6.5	6.5	8.5	5.5	2.5	3.6
MaD	6.0	6.0	6.0	8.0	5.0	2.0	3.4
MaF	---	---	---	---	---	---	---
Mecklenburg:							
MeB	6.5	6.5	6.5	9.0	5.5	2.5	3.6
MeC	6.0	6.0	6.0	8.5	5.0	2.0	3.4
MeD	5.5	5.5	5.5	7.5	4.5	1.5	3.2
Pacolet:							
PaF	---	---	---	---	---	---	---
PcE3	---	---	---	---	---	---	---
Toccoa:							
Tc	6.5	6.5	6.5	8.5	---	---	6.5
Wilkes:							
WkD	5.0	5.0	3.0	---	---	1.5	1.0
WkF	---	---	---	---	---	---	---

[1]Animal-unit-month: The amount of forage required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for a period of 30 days.

TABLE 7.--YIELDS PER ACRE OF CROPS

[All yields were estimated for a high level of management in 1975. Absence of a yield figure indicates the crop is seldom grown or is not suited]

Soil name and map symbol	Corn	Cotton lint	Soybeans	Wheat	Oats	Grain sorghum	Barley
	Bu	Lb	Bu	Bu	Bu	Bu	Bu
Appling:							
ApB	95	650	35	45	75	65	45
ApC	80	600	30	40	65	55	40
Buncombe:							
[1]BuB	50	---	---	---	40	40	---
Cataula:							
CaB	70	700	30	50	85	60	50
CaC	60	600	25	45	70	50	40
CbC2	---	---	---	---	---	---	---
Cecil:							
CcB	95	750	40	50	90	65	50
CcC	90	700	35	45	85	60	45
CcD	80	600	25	40	75	50	40
CeB2	70	500	30	40	70	55	40
CeC2	60	400	25	30	60	45	35
Chewacla:							
Ch	85	---	30	30	70	65	25
Davidson:							
DaB	100	750	45	50	90	65	50
DaC	90	600	40	45	80	65	45
Durham:							
DuB	85	700	35	45	75	60	45
Enon:							
EnB	85	600	35	40	75	55	40
EnC	75	550	30	35	70	50	35
EnD	65	450	25	30	65	45	30
EnE	---	---	---	---	---	---	---
Helena:							
HeB	75	575	30	40	65	50	40
Hiwassee:							
HsB	95	550	40	50	90	60	50
HsC	85	500	30	40	80	55	40
HsD	75	450	25	30	70	50	30
HwC2	70	375	20	25	65	45	25
HwD2	---	---	---	---	---	---	---
Iredell:							
IdB	65	900	35	35	65	50	35
Iredell Variant:							
IvA	70	700	35	30	55	45	30

See footnote at end of table.

TABLE 7.--YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Corn	Cotton lint	Soybeans	Wheat	Oats	Grain sorghum	Barley
	Bu	Lb	Bu	Bu	Bu	Bu	Bu
Madison:							
MaB	90	700	40	50	85	55	50
MaC	80	600	30	40	75	50	40
MaD	70	500	25	35	60	45	35
MaF	---	---	---	---	---	---	---
Mecklenburg:							
MeB	90	600	40	40	70	55	40
MeC	80	550	35	35	65	50	35
MeD	70	450	30	35	60	45	---
Pacolet:							
PaF	---	---	---	---	---	---	---
PcE3	---	---	---	---	---	---	---
Toccoa:							
Tc	75	---	25	---	---	55	---
Wilkes:							
WkD	---	---	---	---	---	---	---
WkF	---	---	---	---	---	---	---

[1]Yields are for areas protected from flooding.

TABLE 8.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas excluded. Absence of an entry means no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
I	---	---	---	---
II	94,350	94,350	---	---
III	104,760	82,515	21,617	628
IV	55,697	55,697	---	---
V	---	---	---	---
VI	7,680	7,680	---	---
VII	60,349	60,349	---	---
VIII	---	---	---	---
Total	322,836	300,519	21,617	628

TABLE 9.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed in this table. Absence of an entry in a column means the information was not available]

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
Appling:							
ApB, ApC	3o	Slight	Slight	Slight	Loblolly pine	81	Eastern redcedar, eastern white pine, loblolly pine, slash pine, yellow-poplar.
					Shortleaf pine	65	
					Scarlet oak	68	
					Southern red oak	76	
					Virginia pine	74	
					White oak	71	
					Yellow-poplar	90	
Buncombe:							
BuB	2s	Slight	Moderate	Moderate	Eastern cottonwood	100	Eastern cottonwood, loblolly pine, American sycamore.
					American sycamore	90	
					Sweetgum	90	
					Loblolly pine	90	
					Yellow-poplar	100	
Cataula:							
CaB, CaC	3o	Slight	Slight	Slight	Loblolly pine	80	Loblolly pine, slash pine, yellow-poplar, white oak, southern red oak.
					Shortleaf pine	66	
					Scarlet oak	84	
					White oak	81	
					Yellow-poplar	88	
CbC2	5c	Moderate	Moderate	Moderate	Loblolly pine	65	Loblolly pine, slash pine, Virginia pine.
					Shortleaf pine	55	
Cecil:							
CcB, CcC, CcD	3o	Slight	Slight	Slight	Eastern white pine	80	Eastern white pine, loblolly pine, slash pine, yellow-poplar.
					Loblolly pine	80	
					Shortleaf pine	69	
					Virginia pine	73	
					Black oak	66	
					Northern red oak	82	
					Post oak	65	
					Scarlet oak	80	
CeB2, CeC2	4c	Moderate	Moderate	Moderate	Loblolly pine	72	Loblolly pine, slash pine, Virginia pine.
					Shortleaf pine	66	
					Virginia pine	65	
Chewacla:							
Ch	1w	Slight	Moderate	Moderate	Loblolly pine	96	Loblolly pine, slash pine, American sycamore, yellow-poplar, sweetgum, eastern white pine, green ash.
					Yellow-poplar	104	
					American sycamore	90	
					Sweetgum	97	
					Water oak	86	
					Eastern cottonwood	100	
					Green ash	97	
					Southern red oak	90	
Davidson:							
DaB, DaC	3o	Slight	Slight	Slight	Loblolly pine	81	Loblolly pine, slash pine, yellow-poplar.
					Shortleaf pine	68	
					Northern red oak	86	
					Southern red oak	72	
					Sweetgum	80	
					White oak	71	
					Yellow-poplar	80	

TABLE 9.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
Durham:							
DuB	3o	Slight	Slight	Slight	Loblolly pine	80	Loblolly pine, slash pine, yellow-poplar.
					Post oak	70	
					Shortleaf pine	72	
					Southern red oak	80	
					Sweetgum	80	
					White oak	70	
					Yellow-poplar	80	
Enon:							
EnB, EnC, EnD	4o	Slight	Slight	Slight	Loblolly pine	71	Eastern redcedar, loblolly pine, slash pine, Virginia pine.
					Shortleaf pine	60	
					Virginia pine	65	
EnE	4r	Moderate	Moderate	Slight	Loblolly pine	71	Eastern redcedar, loblolly pine, slash pine.
					Shortleaf pine	60	
					Virginia pine	65	
Helena:							
HeB	3w	Slight	Slight	Slight	Loblolly pine	80	Loblolly pine, Virginia pine, yellow-poplar.
					Shortleaf pine	63	
					White oak	64	
					Yellow-poplar	87	
Hiwassee:							
HsB, HsC, HsD	3o	Slight	Slight	Slight	Loblolly pine	75	Loblolly pine, yellow-poplar, slash pine.
					Northern red oak	70	
					Shortleaf pine	70	
					White oak	70	
					Yellow-poplar	85	
HwC2, HwD2	4c	Moderate	Moderate	Moderate	Loblolly pine	70	Loblolly pine, slash pine.
					Shortleaf pine	60	
Iredell:							
IdB	4c	Slight	Moderate	Moderate	Loblolly pine	67	Loblolly pine, eastern redcedar.
					Shortleaf pine	58	
					Post oak	44	
					White oak	47	
Iredell Variant:							
IvA	4w	Slight	Moderate	Moderate	Loblolly pine	67	Loblolly pine, eastern redcedar.
					Shortleaf pine	58	
					Post oak	44	
					White oak	47	
					Water oak	---	
					Sweetgum	---	
Madison:							
MaB, MaC, MaD	3o	Slight	Slight	Slight	Loblolly pine	73	Loblolly pine, slash pine, longleaf pine, yellow-poplar.
					Longleaf pine	63	
					Shortleaf pine	66	
					Southern red oak	81	
					Yellow-poplar	96	
MaF	3r	Moderate	Moderate	Slight	Loblolly pine	73	Loblolly pine, slash pine, longleaf pine, yellow-poplar.
					Longleaf pine	63	
					Shortleaf pine	66	
					Southern red oak	81	
					Yellow-poplar	96	
Mecklenburg:							
MeB, MeC, MeD	4o	Slight	Slight	Slight	Loblolly pine	75	Loblolly pine, Virginia pine, yellow-poplar, slash pine, eastern redcedar.
					Shortleaf pine	67	
					Southern red oak	75	
					Sweetgum	82	
					White oak	71	
					Yellow-poplar	89	

TABLE 9.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
Pacolet:							
PaF	3r	Moderate	Moderate	Slight	Loblolly pine	78	Loblolly pine, eastern white pine, shortleaf pine, yellow-poplar.
					Shortleaf pine	70	
					Yellow-poplar	90	
PcE3	4c	Severe	Severe	Severe	Loblolly pine	70	Loblolly pine, shortleaf pine, yellow-poplar.
					Shortleaf pine	60	
Toccoa:							
Tc	1o	Slight	Slight	Slight	Loblolly pine	90	Loblolly pine, yellow-poplar, American sycamore, cherrybark oak.
					Yellow-poplar	107	
					Sweetgum	100	
					Southern red oak	---	
Wilkes:							
WkD	4o	Slight	Slight	Slight	Loblolly pine	75	Eastern redcedar, loblolly pine, Virginia pine.
					Post oak	79	
					Shortleaf pine	63	
					Southern red oak	76	
					Sweetgum	82	
WkF	4r	Moderate	Moderate	Slight	Loblolly pine	75	Eastern redcedar, loblolly pine, Virginia pine.
					Post oak	79	
					Shortleaf pine	63	
					Southern red oak	76	
					Sweetgum	82	

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Appling:					
ApB	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Slight.
ApC	Moderate: too clayey.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
Buncombe:					
BuB	Severe: floods, cutbanks cave.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Cataula:					
CaB	Moderate: cemented pan.	Moderate: low strength.	Moderate: cemented pan, low strength.	Moderate: low strength, slope.	Moderate: low strength.
CaC, CbC2	Moderate: cemented pan.	Moderate: low strength, slope.	Moderate: cemented pan, low strength, slope.	Severe: slope.	Moderate: low strength.
Cecil:					
CcB, CeB2	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.
CcC, CcD, CeC2	Moderate: too clayey.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength.
Chewacla:					
Ch	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
Davidson:					
DaB	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.
DaC	Moderate: too clayey.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength.
Durham:					
DuB	Slight	Slight	Slight	Moderate: slope.	Slight.
Enon:					
EnB, EnC, EnD, EnE	Severe: too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.
Helena:					
HeB	Severe: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.
Hiwassee:					
HsB	Moderate: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: slope.	Moderate: low strength.
HsC, HsD, HwC2, HwD2	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Iredell:					
IdB	Severe: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Iredell Variant:					
IvA	Severe: too clayey, wetness.	Severe: shrink-swell, wetness, low strength.	Severe: shrink-swell, wetness, low strength.	Severe: shrink-swell, wetness, low strength.	Severe: shrink-swell, wetness, low strength.
Madison:					
MaB	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.
MaC, MaD	Moderate: too clayey.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength.
MaF	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Mecklenburg:					
MeB	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: slope, low strength.	Severe: low strength.
MeC, MeD	Severe: too clayey.	Severe: low strength.	Severe: slope, low strength.	Severe: slope, low strength.	Severe: low strength.
Pacolet:					
PaF, PcE3	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Toccoa:					
Tc	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Wilkes:					
WkD	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.
WkF	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

TABLE 11.--SANITARY FACILITIES

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms used to rate soils]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Appling:					
ApB	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
ApC	Moderate: slope, percs slowly.	Severe: slope, seepage.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey, slope.
Buncombe:					
BuB	Severe: floods.	Severe: floods, seepage.	Severe: floods, seepage.	Severe: floods, seepage.	Fair: too sandy.
Cataula:					
CaB	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
CaC, CbC2	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey, slope.
Cecil:					
CcB, CeB2	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
CcC, CcD, CeC2	Moderate: slope, percs slowly.	Severe: slope.	Moderate too clayey.	Moderate: slope.	Fair: too clayey.
Chewacla:					
Ch	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe wetness, floods.	Good.
Davidson:					
DaB	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
DaC	Moderate: slope, percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey, slope.
Durham:					
DuB	Slight	Moderate: slope, seepage.	Slight	Slight	Good.
Enon:					
EnB	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey.
EnC, EnD	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
EnE	Severe: slope. percs slowly.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: too clayey.
Helena:					
HeB	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey.
Hiwassee:					
HsB	Moderate: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight	Fair: too clayey.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Hiwassee: HsC, HsD, HwC2, HwD2	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey.
Iredell: IdB	Severe: percs slowly.	Moderate: slope.	Severe: too clayey, depth to rock.	Slight	Poor: too clayey.
Iredell Variant: IvA	Severe: percs slowly, wetness.	Slight	Severe: too clayey, wetness.	Severe: wetness.	Poor: too clayey, wetness.
Madison: MaB	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
MaC, MaD	Moderate: slope, percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey.
MaF	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Mecklenburg: MeB	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey.
MeC, MeD	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
Pacolet: PaF	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PcE3	Severe: slope.	Severe: slope.	Moderate: too clayey, slope.	Severe: slope.	Poor: slope.
Toccoa: Tc	Severe: floods.	Severe: floods, seepage.	Severe: floods, seepage.	Severe: floods, seepage.	Good.
Wilkes: WkD	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Moderate: slope.	Poor: thin layer.
WkF	Severe: slope.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Poor: thin layer.

TABLE 12.--CONSTRUCTION MATERIALS

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor"]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Appling:				
ApB, ApC	Fair: low strength, area reclaim.	Unsuited	Unsuited	Fair: thin layer.
Buncombe:				
BuB	Good	Fair: excess fines.	Poor: excess fines.	Poor: too sandy.
Cataula:				
CaB, CaC, CbC2	Fair: low strength.	Unsuited	Unsuited	Poor: thin layer.
Cecil:				
CcB, CcC, CcD, CeB2, CeC2	Fair: low strength.	Unsuited	Unsuited	Poor: too clayey, thin layer.
Chewacla:				
Ch	Poor: wetness, low strength.	Unsuited	Unsuited	Good.
Davidson:				
DaB, DaC	Fair: low strength.	Unsuited	Unsuited	Poor: too clayey, thin layer.
Durham:				
DuB	Good	Unsuited	Unsuited	Fair: too sandy, thin layer.
Enon:				
EnB, EnC, EnD, EnE	Poor: shrink-swell, low strength.	Unsuited	Unsuited	Poor: thin layer.
Helena:				
HeB	Poor: shrink-swell, low strength.	Unsuited	Unsuited	Fair: thin layer.
Hiwassee:				
HsB, HsC, HsD, HwC2, HwD2	Fair: low strength.	Unsuited	Unsuited	Poor: thin layer, too clayey.
Iredell:				
IdB	Poor: low strength, shrink-swell.	Unsuited	Unsuited	Poor: thin layer.
Iredell Variant:				
IvA	Poor: low strength, shrink-swell, wetness.	Unsuited	Unsuited	Poor: wetness.
Madison:				
MaB, MaC, MaD	Poor: low strength.	Unsuited	Unsuited	Poor: thin layer.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Madison:				
MaF	Poor: slope, low strength.	Unsuited	Unsuited	Poor: slope, thin layer.
Mecklenburg:				
MeB, MeC, MeD	Poor: low strength.	Unsuited	Unsuited	Poor: thin layer.
Pacolet:				
PaF	Poor: slope.	Unsuited	Unsuited	Poor: thin layer, slope.
PcE3	Fair: low strength, slope.	Unsuited	Unsuited	Poor: thin layer, slope.
Toccoa:				
Tc	Good	Poor	Unsuited	Good.
Wilkes:				
WkD	Fair: thin layer.	Unsuited	Unsuited	Poor: thin layer.
WkF	Poor: slope.	Unsuited	Unsuited	Poor: thin layer.

TABLE 13.--WATER MANAGEMENT

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Appling:						
ApB	Moderate: seepage.	Moderate: low strength, hard to pack.	Not needed	Favorable	Favorable	Favorable.
ApC	Moderate: seepage.	Moderate: low strength, hard to pack.	Not needed	Slope	Slope	Favorable.
Buncombe:						
BuB	Severe: seepage.	Severe: seepage.	Not needed	Floods, fast intake.	Not needed	Not needed.
Cataula:						
CaB	Slight	Moderate: low strength, hard to pack.	Not needed	Complex slope, erodes easily, percs slowly.	Favorable	Favorable.
CaC, CbC2	Slight	Moderate: low strength, hard to pack.	Not needed	Complex slope, erodes easily, percs slowly.	Complex slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Cecil:						
CcB, CcC, CcD, CeB2, CeC2	Moderate: seepage.	Moderate: low strength, hard to pack.	Not needed	Complex slope	Complex slope	Complex slope.
Chewacla:						
Ch	Moderate: seepage.	Moderate: piping.	Poor outlets, floods.	Wetness, floods.	Not needed	Not needed.
Davidson:						
DaB	Moderate: seepage.	Moderate: low strength, hard to pack.	Not needed	Favorable	Favorable	Favorable.
DaC	Moderate: seepage.	Moderate: low strength, hard to pack.	Not needed	Slope	Slope	Slope.
Durham:						
DuB	Moderate: seepage.	Slight	Not needed	Favorable	Favorable	Favorable.
Enon:						
EnB, EnC, EnD, EnE	Slight	Severe: shrink-swell, hard to pack.	Not needed	Percs slowly	Erodes easily, slope, percs slowly.	Percs slowly, erodes easily.
Helena:						
HeB	Moderate: depth to rock.	Moderate: shrink-swell, erodes easily, low strength.	Not needed	Erodes easily	Favorable	Favorable.
Hiwassee:						
HsB	Moderate: seepage.	Moderate: low strength, hard to pack.	Not needed	Favorable	Favorable	Favorable.
HsC, HwC2	Moderate: seepage.	Moderate: low strength, hard to pack.	Not needed	Slope	Slope	Slope.
HsD, HwD2	Moderate: seepage.	Moderate: low strength, hard to pack.	Not needed	Slope	Slope	Slope.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Iredell:						
IdB	Slight	Severe: shrink-swell, hard to pack.	Percs slowly, slope.	Percs slowly, slope.	Percs slowly, slope.	Percs slowly, slope.
Iredell Variant:						
IvA	Slight	Severe: shrink-swell, hard to pack.	Percs slowly, wetness.	Percs slowly, wetness.	Not needed	Not needed.
Madison:						
MaB	Moderate: seepage.	Moderate: hard to pack, piping, low strength.	Not needed	Favorable	Favorable	Favorable.
MaC, MaD, MaF	Moderate: seepage.	Moderate: hard to pack, piping, low strength.	Not needed	Slope, erodes easily.	Erodes easily, slope.	Slope.
Mecklenburg:						
MeB	Moderate: depth to rock, slope.	Severe: hard to pack, thin layer.	Not needed	Favorable	Favorable	Favorable.
MeC, MeD	Moderate: depth to rock, slope.	Severe: hard to pack, thin layer.	Not needed	Slope	Slope	Slope.
Pacolet:						
PaF, PcE3	Moderate: seepage, slope.	Moderate: low strength, hard to pack.	Not needed	Complex slope, erodes easily.	Complex slope, erodes easily.	Slope, erodes easily.
Toccoa:						
Tc	Severe: seepage.	Moderate: piping.	Not needed	Floods, seepage.	Not needed	Not needed.
Wilkes:						
WkD, WkF	Severe: depth to rock.	Severe: thin layer.	Not needed	Complex slope	Depth to rock, complex slope.	Slope.

TABLE 14.--RECREATIONAL DEVELOPMENT

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Appling:				
ApB	Slight	Slight	Moderate: slope.	Slight.
ApC	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Buncombe:				
BuB	Severe: floods, too sandy.	Moderate: floods, too sandy.	Severe: floods, too sandy.	Moderate: floods, too sandy.
Cataula:				
CaB	Moderate: percs slowly.	Slight	Moderate: percs slowly, slope.	Slight.
CaC	Moderate: percs slowly, slope.	Moderate: slope.	Severe: slope.	Slight.
CbC2	Moderate: percs slowly, too clayey, slope.	Moderate: too clayey, slope.	Severe: slope.	Moderate: too clayey.
Cecil:				
CcB	Slight	Slight	Moderate: slope.	Slight.
CcC, CcD	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
CeB2	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.
CeC2	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.
Chewacla:				
Ch	Severe: wetness, floods.	Severe: floods.	Severe: wetness, floods.	Moderate: wetness, floods.
Davidson:				
DaB	Slight	Slight	Moderate: slope.	Slight.
DaC	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Durham:				
DuB	Slight	Slight	Moderate: slope.	Slight.
Enon:				
EnB	Moderate: percs slowly.	Slight	Moderate: percs slowly, slope.	Slight.
EnC, EnD	Moderate: percs slowly, slope.	Moderate: slope.	Severe: slope.	Slight.

TABLE 14.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Enon:				
EnE	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Helena:				
HeB	Moderate: percs slowly.	Moderate: wetness.	Moderate: percs slowly.	Moderate: wetness.
Hiwassee:				
HsB	Slight	Slight	Moderate: slope.	Slight.
HsC, HsD	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
HwC2, HwD2	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope, too clayey.	Moderate: too clayey.
Iredell:				
IdB	Moderate: percs slowly, too clayey.	Moderate: too clayey.	Moderate: percs slowly, slope.	Moderate: too clayey, slope.
Iredell Variant:				
IvA	Severe: wetness, percs slowly.	Moderate: wetness, too clayey.	Severe: wetness, percs slowly.	Moderate: wetness, too clayey.
Madison:				
MaB	Slight	Slight	Moderate: slope.	Slight.
MaC, MaD	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
MaF	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Mecklenburg:				
MeB	Moderate: percs slowly.	Slight	Moderate: slope, percs slowly.	Slight.
MeC, MeD	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight.
Pacolet:				
PaF	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PcE3	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: too clayey.
Toccoa:				
Tc	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight.
Wilkes:				
WkD	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
WkF	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

TABLE 15.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor"]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Appling:										
ApB	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ApC	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Buncombe:										
BuB	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Cataula:										
CaB	Fair	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CaC	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CbC2	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Cecil:										
CcB	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CcC, CcD	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CeB2, CeC2	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Chewacla:										
Ch	Poor	Fair	Fair	Good	Good	Fair	Very poor.	Fair	Good	Poor.
Davidson:										
DaB	Good	Good	Good	Good	Fair	Very poor.	Very poor.	Good	Good	Very poor.
DaC	Fair	Good	Good	Good	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Durham:										
DuB	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Enon:										
EnB	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EnC, EnD	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EnE	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Helena:										
HeB	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Hiwassee:										
HsB	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 15.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Hiwassee:										
HsC, HsD	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HwC2, HwD2	Fair	Fair	Fair	Good	Fair	Very poor.	Very poor.	Fair	Good	Very poor.
Iredell:										
IdB	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Iredell Variant:										
IvA	Fair	Good	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair.
Madison:										
MaB	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MaC, MaD	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MaF	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
Mecklenburg:										
MeB	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MeC, MeD	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Pacolet:										
PaF	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PcE3	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Toccoa:										
Tc	Fair	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Wilkes:										
WkD	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
WkF	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means greater than Absence of an entry means data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Appling:										
ApB, ApC	0-7	Sandy loam	SM, SM-SC	A-2	86-100	80-100	55-75	15-35	<27	NP-5
	7-55	Sandy clay, clay loam, clay.	MH, CL, ML, SC	A-7	95-100	95-100	70-92	51-75	41-74	15-30
	55-72	Weathered bedrock.	---	---	---	---	---	---	---	---
Buncombe:										
BuB	0-9	Sand	SM	A-2	98-100	98-100	90-97	18-32	---	NP
	9-50	Loamy sand, sand	SM, SP-SM	A-2, A-3	98-100	98-100	98-100	7-32	---	NP
	50-76	Variable	---	---	---	---	---	---	---	---
Cataula:										
CaB, CaC	0-6	Sandy loam	SM, SM-SC	A-2, A-4	95-100	90-100	65-85	20-40	<20	NP-7
	6-23	Clay, clay loam, sandy clay.	MH, ML, CL	A-7, A-6	98-100	90-100	80-95	60-85	36-72	11-38
	23-58	Sandy clay loam, sandy clay, clay loam.	MH, ML	A-5, A-7	98-100	90-100	85-95	51-90	41-75	2-30
	58-67	Sandy clay loam, clay loam.	CL, ML, CL-ML, SC	A-4, A-6	95-100	90-100	70-100	40-70	20-40	2-20
CbC2	0-3	Sandy clay loam	CL, ML, SC	A-4, A-6, A-7	96-100	90-100	70-90	36-60	25-48	9-20
	3-23	Clay, clay loam, sandy clay.	MH, ML, CL	A-7, A-6	98-100	90-100	80-95	60-85	36-72	11-38
	23-58	Sandy clay loam, sandy clay, clay loam.	MH, ML	A-5, A-7	98-100	90-100	85-95	51-90	41-75	2-30
	58-67	Sandy clay loam, clay loam.	CL, ML, CL-ML, SC	A-4, A-6	95-100	90-100	70-100	40-70	20-40	2-20
Cecil:										
CcB, CcC, CcD	0-5	Sandy loam	SM, SM-SC	A-2, A-4	84-100	80-100	67-90	26-42	<30	NP-6
	5-47	Clay	MH, ML	A-7	97-100	92-100	72-99	55-95	41-80	9-37
	47-61	Weathered bedrock.	---	---	---	---	---	---	---	---
CeB2, CeC2	0-3	Sandy clay loam	SM, SC, CL, ML	A-4	74-100	72-100	68-95	38-81	21-28	3-10
	3-47	Clay	MH, ML	A-7	97-100	92-100	72-99	55-95	41-80	9-37
	47-61	Weathered bedrock.	---	---	---	---	---	---	---	---
Chewacla:										
Ch	0-14	Loam	ML, CL	A-4, A-5, A-6, A-7	98-100	95-100	70-100	55-90	36-50	4-20
	14-64	Sandy clay loam, loam, sandy loam.	SM, CL-ML, SM-SC, ML	A-4	96-100	95-100	60-80	36-70	<35	NP-7
	64-76	Variable	---	---	---	---	---	---	---	---
Davidson:										
DaB, DaC	0-5	Loam	CL, CL-ML, ML	A-4, A-6	94-100	84-100	80-95	60-75	18-30	4-15
	5-85	Clay	CL, CH, ML, MH	A-7, A-6	96-100	95-100	85-100	65-85	35-65	15-35
Durham:										
DuB	0-18	Loamy sand	SM	A-2, A-4	100	90-100	60-70	20-40	<11	NP-3
	18-56	Sandy clay loam	SC	A-6, A-4, A-7	100	95-100	65-75	36-49	28-48	7-22
	56-74	Weathered bedrock.	---		---	---	---	---	---	---

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Enon:										
EnB, EnC, EnD, EnE	0-6	Sandy loam	SM, SM-SC, SC	A-2-4, A-4, A-6, A-2	80-100	80-100	60-85	25-49	<30	NP-15
	6-35	Clay loam, clay	CH	A-7	85-100	80-100	75-95	65-95	51-75	25-45
	35-60	Weathered bedrock.	---	---	---	---	---	---	---	---
Helena:										
HeB	0-7	Sandy loam	SM, SM-SC	A-2, A-4	95-100	90-100	51-86	27-46	<25	NP-7
	7-38	Clay loam, sandy clay, clay.	CH, MH	A-7	95-100	95-100	73-93	56-80	50-85	24-50
	38-60	Weathered bedrock.	---	---	---	---	---	---	---	---
Hiwassee:										
HsB, HsC, HsD	0-5	Sandy loam	SM, SM-SC	A-4, A-2	95-100	90-100	70-95	30-50	<35	NP-7
	5-55	Clay, silty clay, clay loam.	CL, ML, MH	A-7, A-6	95-100	95-100	80-100	70-95	36-52	12-20
	55-72	Weathered bedrock.	---	---	---	---	---	---	---	---
HwC2, HwD2	0-3	Clay loam	CL, ML, CL-ML	A-7, A-6, A-4	95-100	95-100	90-100	51-85	25-50	5-23
	3-55	Clay, silty clay, clay loam.	CL, ML, MH	A-7, A-6	95-100	95-100	80-100	70-95	36-52	12-20
	55-72	Weathered bedrock.	---	---	---	---	---	---	---	---
Iredell:										
IdB	0-5	Fine sandy loam	SM, SM-SC	A-2, A-4	90-98	80-90	65-80	30-50	<35	NP-9
	5-22	Clay	CH	A-7	99-100	85-100	80-100	65-95	60-115	30-85
	22-27	Loam, sandy clay loam, clay loam.	CL, CH, SC	A-7	98-100	85-100	70-95	40-75	41-60	20-39
	27-60	Weathered bedrock.	---	---	---	---	---	---	---	---
Iredell Variant:										
IvA	0-8	Loam	ML, CL-ML, CL	A-4, A-6	96-100	85-100	80-95	51-70	25-40	5-12
	8-38	Clay	CH	A-7	96-100	85-100	80-100	65-95	60-115	30-85
	38-42	Clay loam, sandy clay loam.	CL, SC	A-6, A-7	95-100	85-100	70-95	40-75	30-50	10-25
	42-60	Weathered bedrock.	---	---	---	---	---	---	---	---
Madison:										
MaB, MaC, MaD, MaF	0-5	Sandy loam	SC, SM-SC, SM	A-2, A-4	85-100	80-100	60-90	26-49	<35	NP-8
	5-37	Clay, clay loam	MH	A-7	90-100	85-100	75-97	57-85	43-82	12-43
	37-60	Weathered bedrock.	---	---	---	---	---	---	---	---
Mecklenburg:										
MeB, MeC, MeD	0-6	Sandy loam	SC, ML, SM	A-4, A-6, A-7-6	90-100	80-100	70-90	45-75	<45	NP-15
	6-44	Clay	MH, ML, CH	A-7	90-100	85-100	80-100	75-95	45-75	15-35
	44-63	Weathered bedrock.	---	---	---	---	---	---	---	---
Pacolet:										
PaF	0-7	Sandy loam	SM	A-2	85-100	80-100	60-80	20-35	<30	NP-6
	7-31	Sandy clay, clay loam, clay.	ML, MH	A-6, A-7	80-100	80-100	60-95	51-75	38-60	11-27
	31-60	Weathered bedrock.	---	---	---	---	---	---	---	---

TABLE 16.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Pacolet:										
PcE3	0-2	Clay loam	SM, SM-SC, ML, MH	A-4	95-100	90-100	65-85	36-50	20-40	4-17
	2-31	Sandy clay, clay loam, clay	ML, MH	A-6, A-7	80-100	80-100	60-95	51-75	38-60	11-27
	31-60	Weathered bedrock.	---	---	---	---	---	---	---	---
Toccoa:										
Tc	0-5	Sandy loam	SM, ML	A-2, A-4	98-100	95-100	85-100	25-60	<30	NP-4
	5-65	Sandy loam, loam	SM, ML	A-2, A-4	95-100	90-100	60-100	30-55	<30	NP-4
Wilkes:										
WkD, WkF	0-7	Sandy loam	ML, CL-ML, SM, SM-SC	A-2, A-4	94-100	80-100	60-92	25-55	<25	NP-7
	7-16	Clay loam, clay sandy clay loam.	CL, CH, MH, ML	A-6, A-7	80-100	80-100	75-95	50-80	30-60	11-32
	16-44	Weathered bedrock.	---	---	---	---	---	---	---	---

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means greater then. The erosion tolerance factor (T) is for the entire profile. Absence of an entry means data were not available or were not estimated]

Soil name and map symbol	Depth	Permea-bility	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in	pH					
Appling:									
ApB, ApC	0-7	2.0-6.0	0.10-0.15	4.5-5.5	Low	Moderate	Moderate	0.24	4
	7-55	0.6-2.0	0.15-0.17	4.5-5.5	Moderate	Moderate	Moderate	0.20	
	55-72	---	---	---	---	---	---	---	
Buncombe:									
BuB	0-9	>6.0	0.06-0.10	6.1-6.5	Low	Low	Moderate	0.10	5
	9-50	>6.0	0.03-0.07	4.5-6.0	Low	Low	Moderate	0.10	
	50-76	---	---	---	---	---	---	---	
Cataula:									
CaB, CaC	0-6	2.0-6.0	0.08-0.11	4.5-6.0	Low	Low	High	0.32	3
	6-23	0.2-0.6	0.13-0.18	4.5-6.0	Low	High	High	0.24	
	23-58	0.06-0.2	0.06-0.08	4.5-6.0	Low	Moderate	High	0.24	
	58-67	0.2-0.6	0.10-0.15	4.5-6.0	Low	Moderate	High	0.32	
CbC2	0-3	0.6-2.0	0.12-0.16	4.5-6.0	Low	Moderate	High	0.32	3
	3-23	0.2-0.6	0.13-0.18	4.5-6.0	Low	High	High	0.24	
	23-58	0.06-0.2	0.06-0.08	4.5-6.0	Low	Moderate	High	0.24	
	58-67	0.2-0.6	0.10-0.15	4.5-6.0	Low	Moderate	High	0.32	
Cecil:									
CcB, CcC, CcD	0-5	2.0-6.0	0.12-0.14	4.5-6.0	Low	Moderate	Moderate	0.28	4
	5-47	0.6-2.0	0.13-0.15	4.5-5.5	Moderate	Moderate	Moderate	0.28	
	47-61	---	---	---	---	---	---	---	
CeB2, CeC2	0-3	0.6-2.0	0.13-0.15	4.5-6.0	Low	Moderate	Moderate	0.28	3
	3-47	0.6-2.0	0.13-0.15	4.5-5.5	Moderate	Moderate	Moderate	0.28	
	47-61	---	---	---	---	---	---	---	
Chewacla:									
Ch	0-14	0.6-2.0	0.15-0.24	5.1-7.3	Low	High	Moderate	0.28	4
	14-64	0.6-2.0	0.12-0.20	5.1-7.3	Low	High	Moderate	0.28	
	64-76	---	---	---	---	---	---	---	
Davidson:									
DaB, DaC	0-5	0.6-2.0	0.14-0.18	4.5-6.5	Low	High	Moderate	0.28	5
	5-85	0.6-2.0	0.12-0.16	4.5-6.0	Low	High	Moderate	0.24	
Durham:									
DuB	0-18	2.0-6.0	0.07-0.12	4.5-6.0	Low	Moderate	Moderate	0.17	4
	18-56	0.6-2.0	0.12-0.16	4.5-5.5	Low	Moderate	Moderate	0.20	
	56-74	---	---	---	---	---	---	---	
Enon:									
EnB, EnC, EnD, EnE	0-6	2.0-6.0	0.11-0.15	5.1-6.5	Low	High	Moderate	0.37	4
	6-35	0.06-0.2	0.15-0.20	5.1-7.8	High	High	Moderate	0.32	
	35-60	---	---	---	---	---	---	---	
Helena:									
HeB	0-7	2.0-6.0	0.10-0.12	4.5-6.0	Low	High	Moderate	0.37	3
	7-38	0.06-0.2	0.13-0.15	4.5-5.5	High	High	High	0.32	
	38-60	---	---	---	---	---	---	---	
Hiwassee:									
HsB, HsC, HsD	0-5	0.6-2.0	0.10-0.14	4.5-6.5	Low	Moderate	Moderate	0.28	5
	5-55	0.6-2.0	0.12-0.15	4.5-6.5	Low	Moderate	Moderate	0.28	
	55-72	---	---	---	---	---	---	---	
HwC2, HwD2	0-3	0.6-2.0	0.12-0.15	4.5-6.5	Low	Moderate	Moderate	0.28	4
	3-55	0.6-2.0	0.12-0.15	4.5-6.5	Low	Moderate	Moderate	0.28	
	55-72	---	---	---	---	---	---	---	

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permea-bility	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion		Erosion factors	
						Uncoated steel	Concrete	K	T
	In	In/hr	In/in	pH					
Iredell:									
IdB	0-5	2.0-6.0	0.12-0.15	5.6-7.3	Low	Moderate	Low	0.32	3
	5-22	0.06-0.2	0.16-0.22	6.1-7.3	Very high	High	Low	0.20	
	22-27	0.06-0.6	0.14-0.18	6.1-7.8	High	High	Low	0.28	
	27-60	---	---	---				---	
Iredell Variant:									
IvA	0-8	0.6-2.0	0.14-0.17	6.1-8.4	Low	Moderate	Low	0.32	3
	8-38	0.06-0.2	0.16-0.22	6.6-8.4	Very high	High	Low	0.20	
	38-42	0.06-0.6	0.14-0.18	6.6-8.4	High	High	Low	0.28	
	42-60	---	---	---				---	
Madison:									
MaB, MaC, MaD, MaF	0-5	2.0-6.0	0.11-0.15	4.5-6.0	Low	High	Moderate	0.32	4
	5-37	0.6-2.0	0.13-0.18	4.5-5.5	Low	High	Moderate	0.32	
	37-60	---	---	---				---	
Mecklenburg:									
MeB, MeC, MeD	0-6	0.6-2.0	0.14-0.19	5.6-7.3	Low	High	Moderate	0.28	4
	6-44	0.06-0.2	0.12-0.14	5.6-7.3	Moderate	High	Moderate	0.32	
	44-63	---	---	---				---	
Pacolet:									
PaF	0-7	2.0-6.0	0.08-0.12	4.5-6.0	Low	Moderate	High	0.20	3
	7-31	0.6-2.0	0.12-0.15	4.5-6.0	Low	High	High	0.28	
	31-60	---	---	---				---	
PcE3	0-2	0.6-2.0	0.10-0.14	4.5-6.0	Low	Moderate	High	0.24	2
	2-31	0.6-2.0	0.12-0.15	4.5-6.0	Low	High	High	0.28	
	31-60	---	---	---				---	
Toccoa:									
Tc	0-5	2.0-6.0	0.09-0.12	5.1-6.5	Low	Low	Moderate	0.10	4
	5-65	2.0-6.0	0.06-0.12	5.1-6.5	Low	Low	Moderate	0.10	
Wilkes:									
WkD, WkF	0-7	2.0-6.0	0.11-0.15	5.1-6.5	Low	Moderate	Moderate	0.28	2
	7-16	0.2-0.6	0.15-0.20	6.1-7.8	Moderate	Moderate	Moderate	0.32	
	16-44	---	---	---				---	

TABLE 18.--SOIL AND WATER FEATURES

[Absence of an entry indicates the feature is not a concern. See text for descriptions of symbols and such terms as "rare," "brief," and "perched." The symbol < means less than; > means greater than]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness
					Ft			In	
Appling: ApB, ApC	B	None	---	---	>6.0	---	---	>60	---
Buncombe: BuB	A	Frequent	Very brief	Feb-Jun	>6.0	---	---	>60	---
Cataula: CaB, CaC, CbC2	B	None	---	---	>6.0	---	---	>60	---
Cecil: CcB, CcC, CcD, CeB2, CeC2	B	None	---	---	>6.0	---	---	>60	---
Chewacla: Ch	C	Common	Brief	Nov-Apr	0.5-1.5	Apparent	Nov-Apr	>60	---
Davidson: DaB, DaC	B	None	---	---	>6.0	---	---	>60	---
Durham: DuB	B	None	---	---	>6.0	---	---	>60	---
Enon: EnB, EnC, EnD, EnE	C	None	---	---	>6.0	---	---	>60	---
Helena: HeB	C	None	---	---	1.0-2.5	Perched	Jan-Mar	>48	Rippable
Hiwassee: HsB, HsC, HsD, HwC2, HwD2	B	None	---	---	>6.0	---	---	>60	---
Iredell: IdB	D	None	---	---	1.0-2.0	Perched	Nov-Mar	20-40	Rippable
Iredell Variant: IvA	D	Rare	---	---	1.0-3.0	Apparent	Dec-Apr	>40	Rippable
Madison: MaB, MaC, MaD, MaF	B	None	---	---	>6.0	---	---	>60	---
Mecklenburg: MeB, MeC, MeD	C	None	---	---	>6.0	---	---	>60	---
Pacolet: PaF, PcE3	B	None	---	---	>6.0	---	---	>60	---
Toccoa: Tc	B	Common	Brief	Jan-Dec	2.5-5.0	Apparent	Dec-Apr	>60	---
Wilkes: WkD, WkF	C	None	---	---	>6.0	---	---	40-80	Hard

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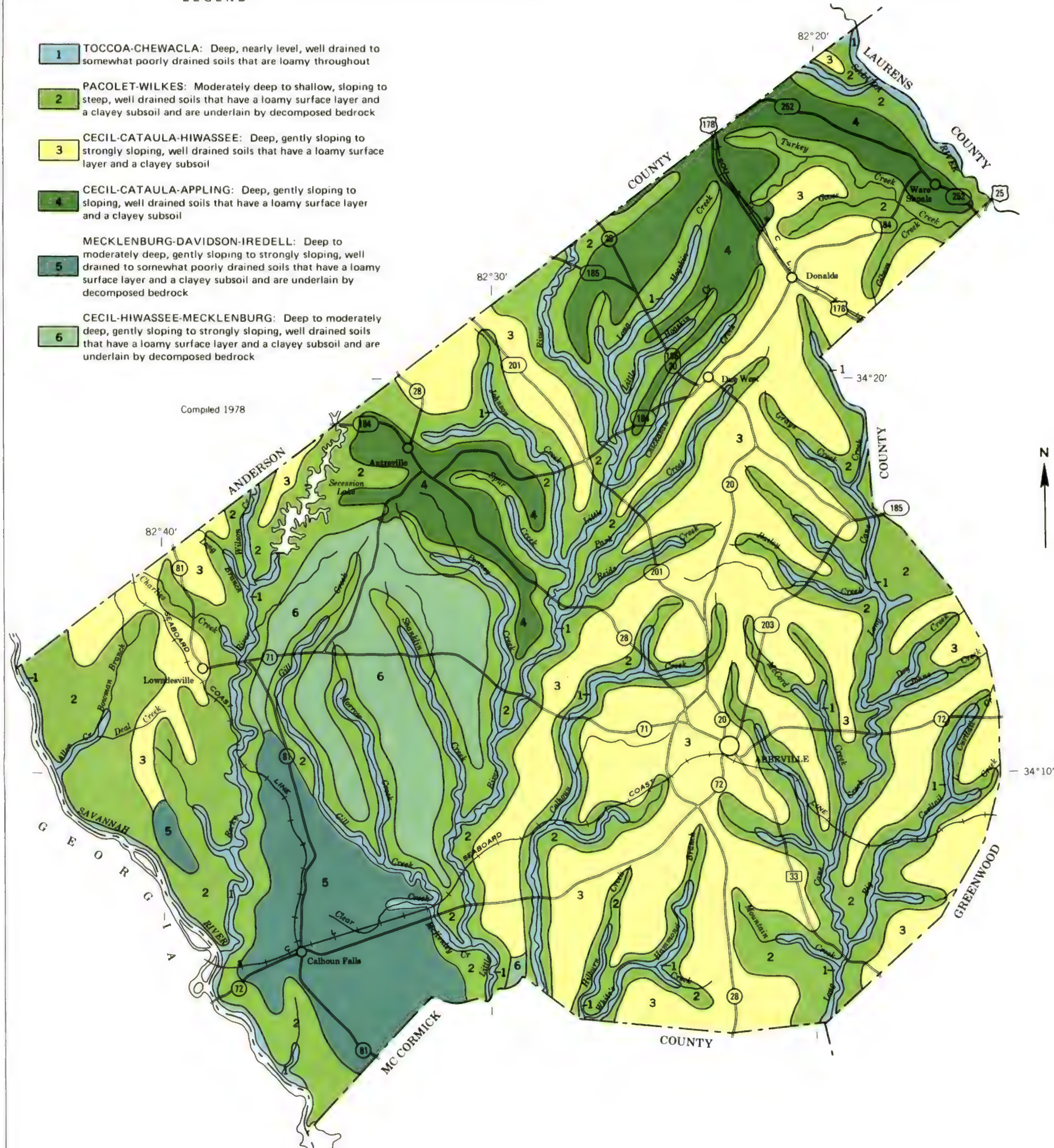
LEGEND

1	TOCCOA-CHEWACLA: Deep, nearly level, well drained to somewhat poorly drained soils that are loamy throughout
2	PACOLET-WILKES: Moderately deep to shallow, sloping to steep, well drained soils that have a loamy surface layer and a clayey subsoil and are underlain by decomposed bedrock
3	CECIL-CATAULA-HIWASSEE: Deep, gently sloping to strongly sloping, well drained soils that have a loamy surface layer and a clayey subsoil
4	CECIL-CATAULA-APPLING: Deep, gently sloping to sloping, well drained soils that have a loamy surface layer and a clayey subsoil
5	MECKLENBURG-DAVIDSON-IREDELL: Deep to moderately deep, gently sloping to strongly sloping, well drained to somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil and are underlain by decomposed bedrock
6	CECIL-HIWASSEE-MECKLENBURG: Deep to moderately deep, gently sloping to strongly sloping, well drained soils that have a loamy surface layer and a clayey subsoil and are underlain by decomposed bedrock

Compiled 1978



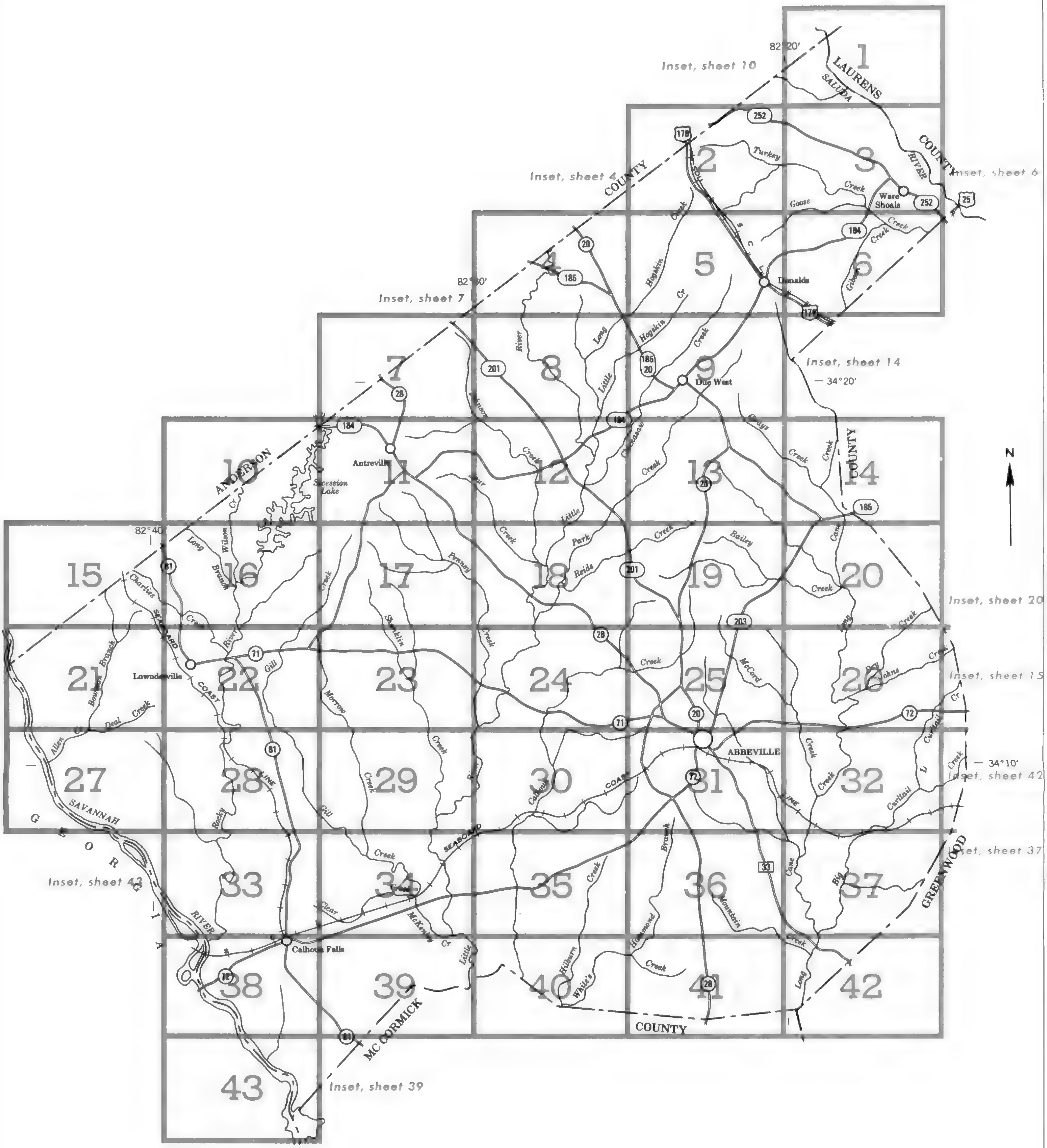
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
FOREST SERVICE
SOUTH CAROLINA AGRICULTURAL EXPERIMENT STATION
SOUTH CAROLINA LAND RESOURCE CONSERVATION COMMISSION

GENERAL SOIL MAP

ABBEVILLE COUNTY, SOUTH CAROLINA

Scale 1 : 190,080

1 0 1 2 3 4 Miles



Original text from each individual map sheet read:
This map is compiled on 1975 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

INDEX TO MAP SHEETS

ABBEVILLE COUNTY, SOUTH CAROLINA

Scale 1: 190,080

1 0 1 2 3 4 Miles

SOIL LEGEND

The first capital letter is the initial one of the soil name. The second position is a lower case letter and may be used to identify additional mapping units that have the same initial capital letter. The third position, where used, is a capital letter and connotes slope class. Symbols without a slope letter are for level soils. The figure 2 or 3 at the end of a symbol indicates the soil is eroded or gullied, respectively.

SYMBOL	NAME
ApB	Appling sandy loam, 2 to 6 percent slopes
ApC	Appling sandy loam, 6 to 10 percent slopes
BuB	Buncombe sand, 0 to 4 percent slopes
CaB	Cataula sandy loam, 2 to 6 percent slopes
CaC	Cataula sandy loam, 6 to 10 percent slopes
CbC2	Cataula sandy clay loam, 6 to 10 percent slopes, eroded
CcB	Cecil sandy loam, 2 to 6 percent slopes
CcC	Cecil sandy loam, 6 to 10 percent slopes
CcD	Cecil sandy loam, 10 to 15 percent slopes
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, eroded
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, eroded
Ch	Chewacla loam
DaB	Davidson loam, 2 to 6 percent slopes
DaC	Davidson loam, 6 to 10 percent slopes
DuB	Durham loamy sand, 2 to 6 percent slopes
EnB	Enon sandy loam, 2 to 6 percent slopes
EnC	Enon sandy loam, 6 to 10 percent slopes
EnD	Enon sandy loam, 10 to 15 percent slopes
EnE	Enon sandy loam, 15 to 25 percent slopes
HeB	Helena sandy loam, 2 to 6 percent slopes
HsB	Hiwassee sandy loam, 2 to 6 percent slopes
HsC	Hiwassee sandy loam, 6 to 10 percent slopes
HsD	Hiwassee sandy loam, 10 to 15 percent slopes
HwC2	Hiwassee clay loam, 6 to 10 percent slopes, eroded
HwD2	Hiwassee clay loam, 10 to 15 percent slopes, eroded
IdB	Iredell fine sandy loam, 2 to 6 percent slopes
IvA	Iredell Varient loam, 0 to 2 percent slopes
MaB	Madison sandy loam, 2 to 6 percent slopes
MaC	Madison sandy loam, 6 to 10 percent slopes
MaD	Madison sandy loam, 10 to 15 percent slopes
MaF	Madison sandy loam, 15 to 40 percent slopes
MeB	Mecklenburg sandy loam, 2 to 6 percent slopes
MeC	Mecklenburg sandy loam, 6 to 10 percent slopes
MeD	Mecklenburg sandy loam, 10 to 15 percent slopes
PaF	Pacolet sandy loam, 15 to 40 percent slopes
PcE3	Pacolet clay loam, 10 to 25 percent slopes, gullied
Tc	Toccoa sandy loam
WkD	Wilkes sandy loam, 6 to 15 percent slopes
WkF	Wilkes sandy loam , 15 to 40 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool — Davis Airstrip; FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate — 79
- Federal — 410
- State — 52
- County, farm or ranch — 378

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water; w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — GAS
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water; w
- Intermittent — int; i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — CeA; FoB2

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

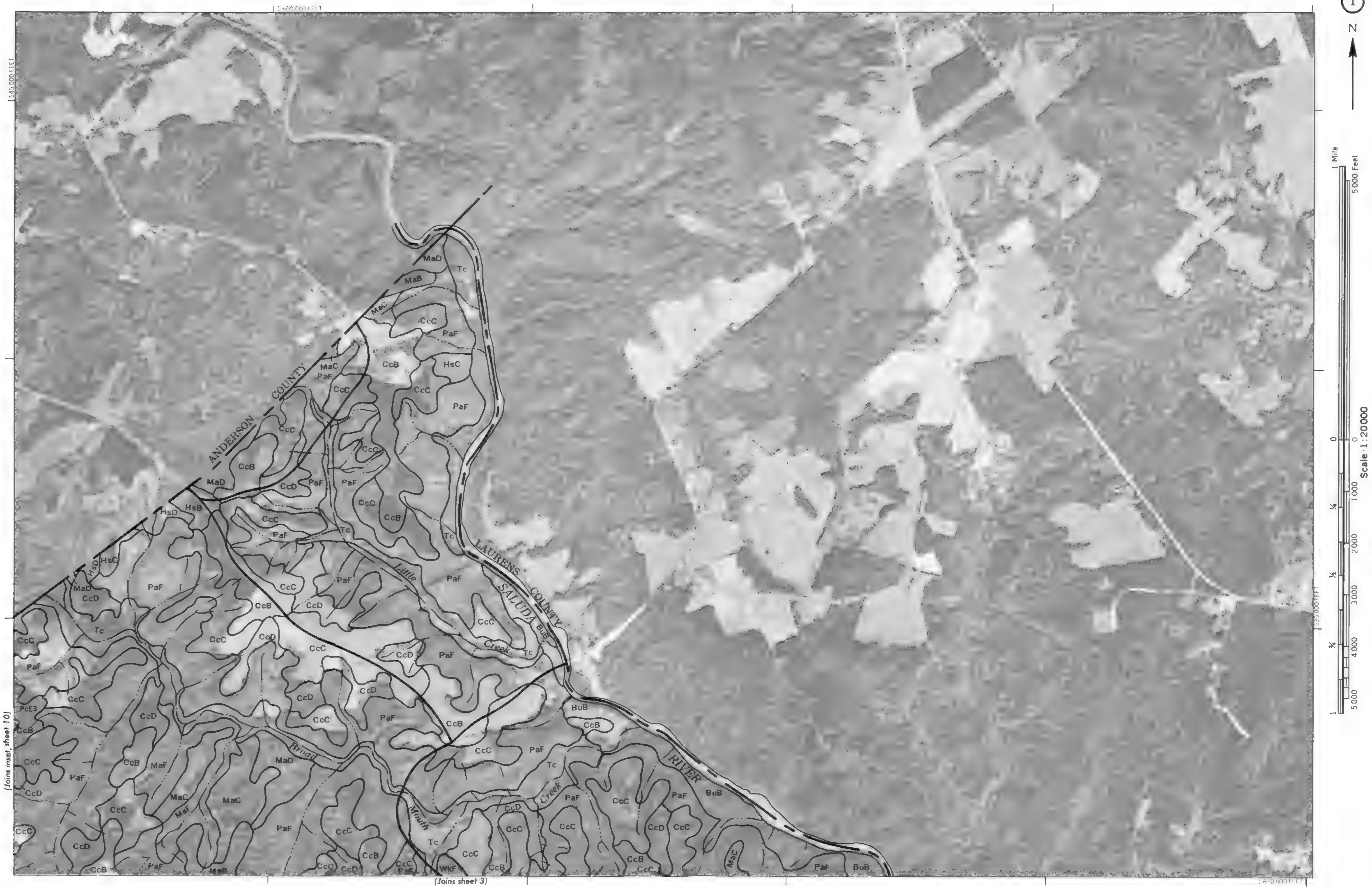
GULLY

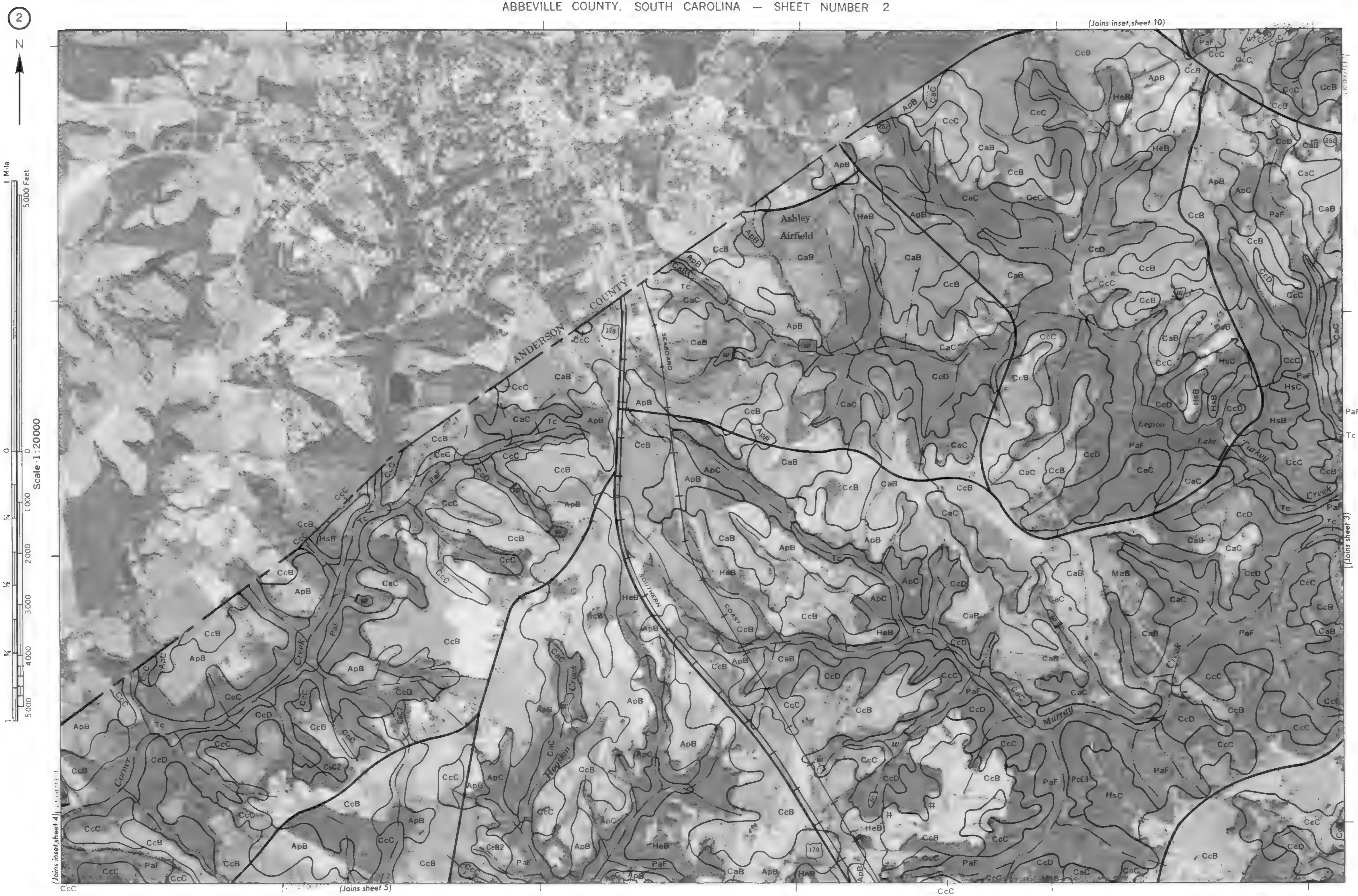
DEPRESSION OR SINK

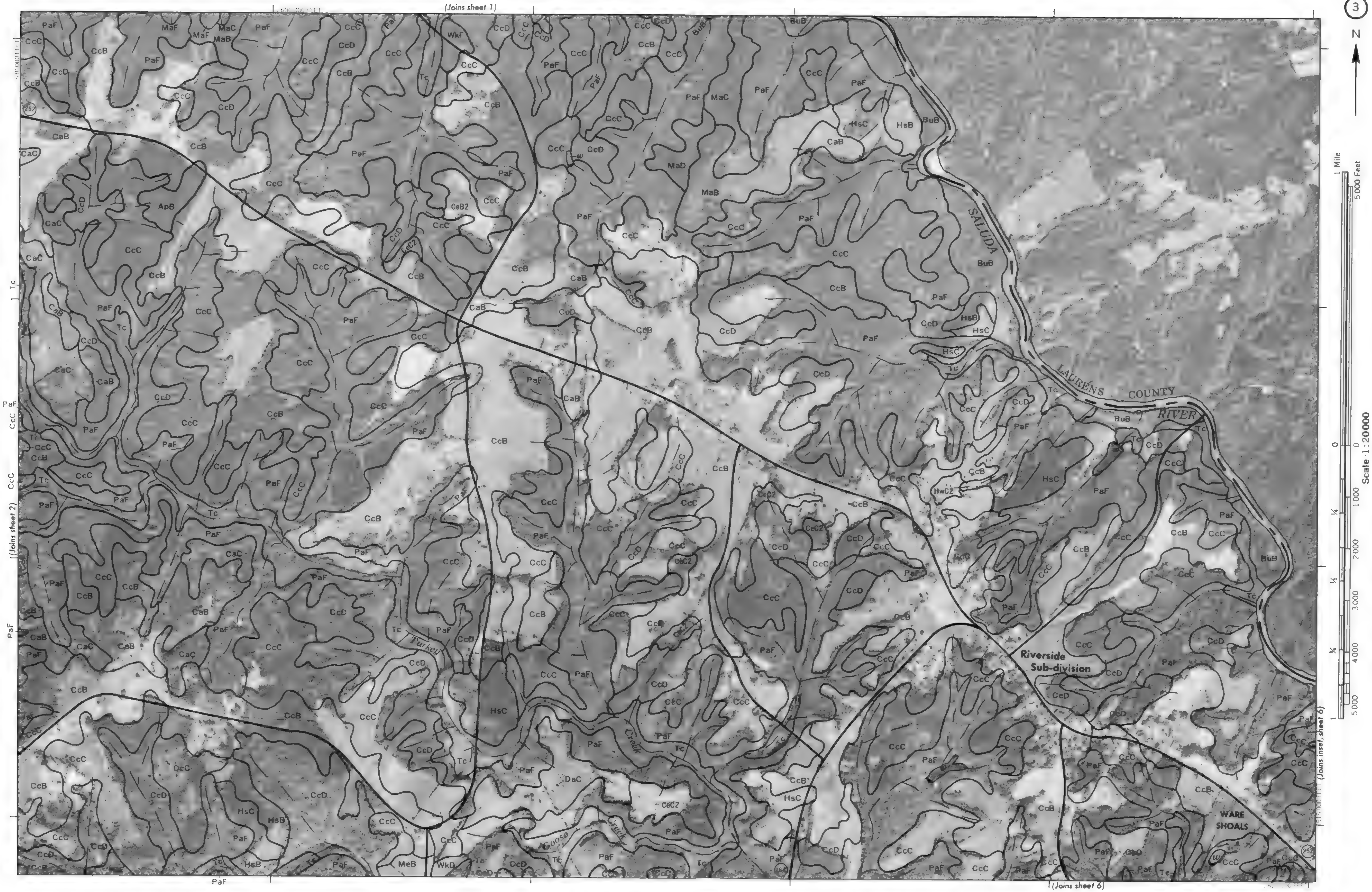
SOIL SAMPLE SITE (normally not shown) — S

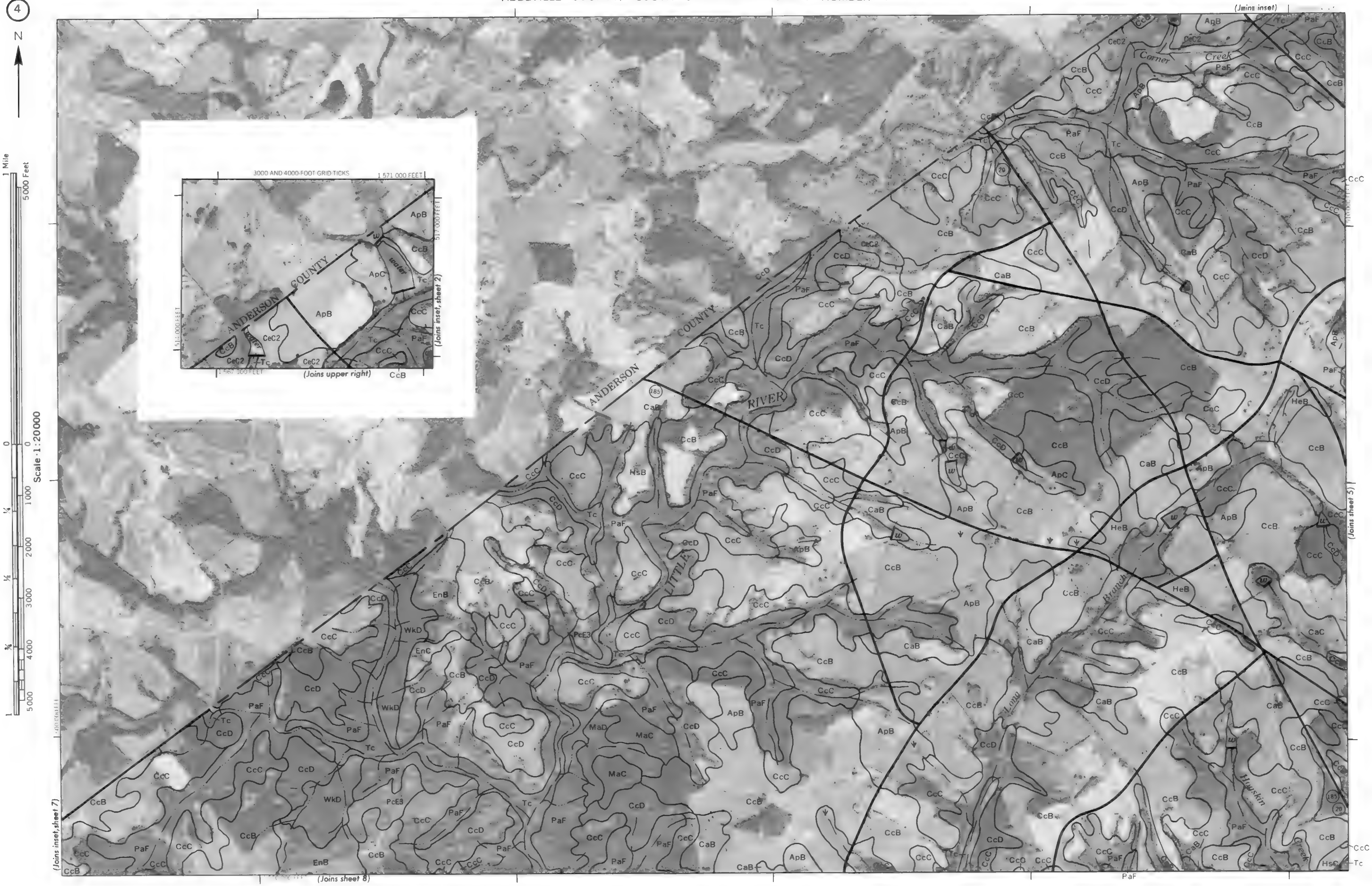
MISCELLANEOUS

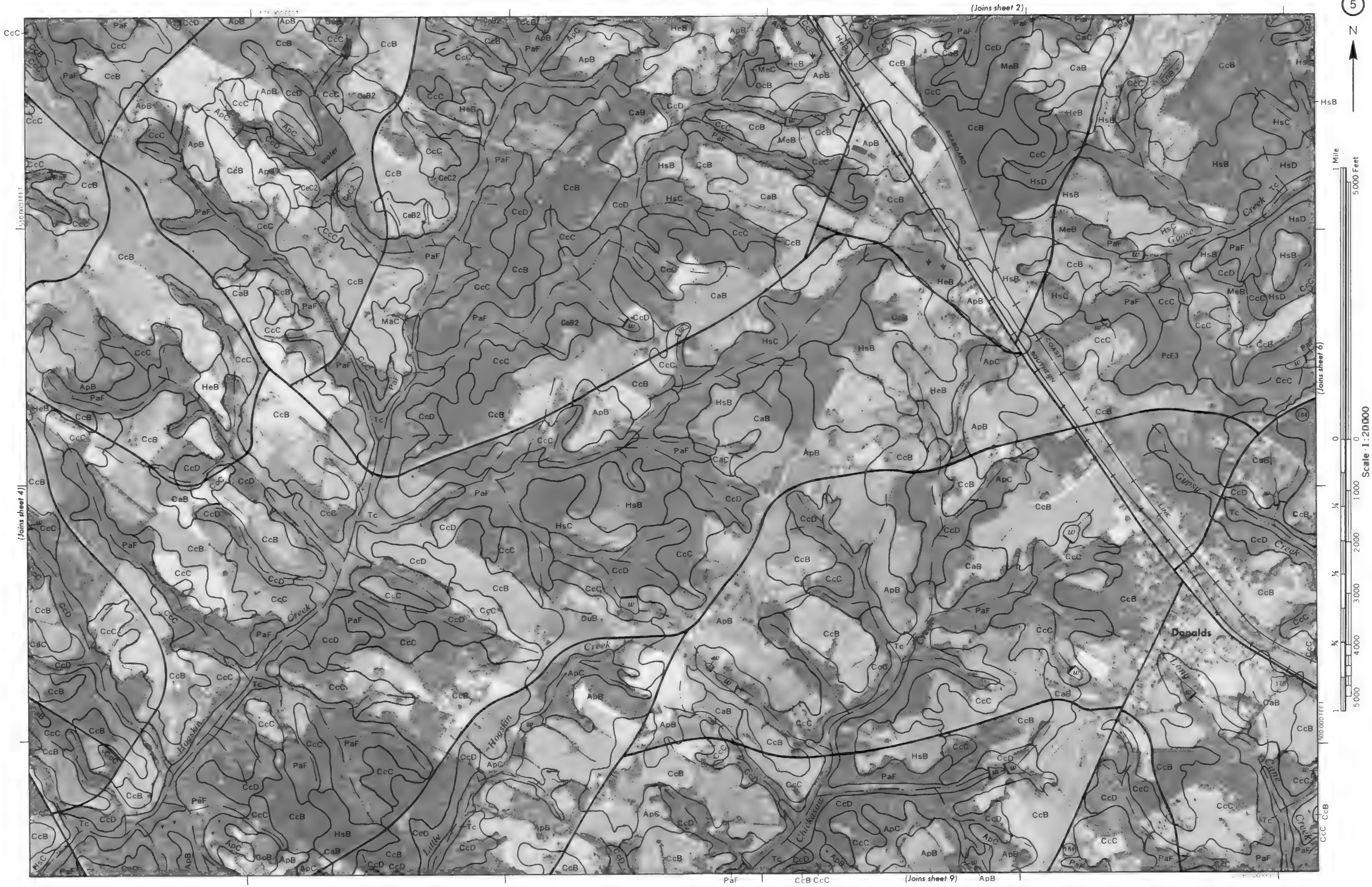
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Borrow areas

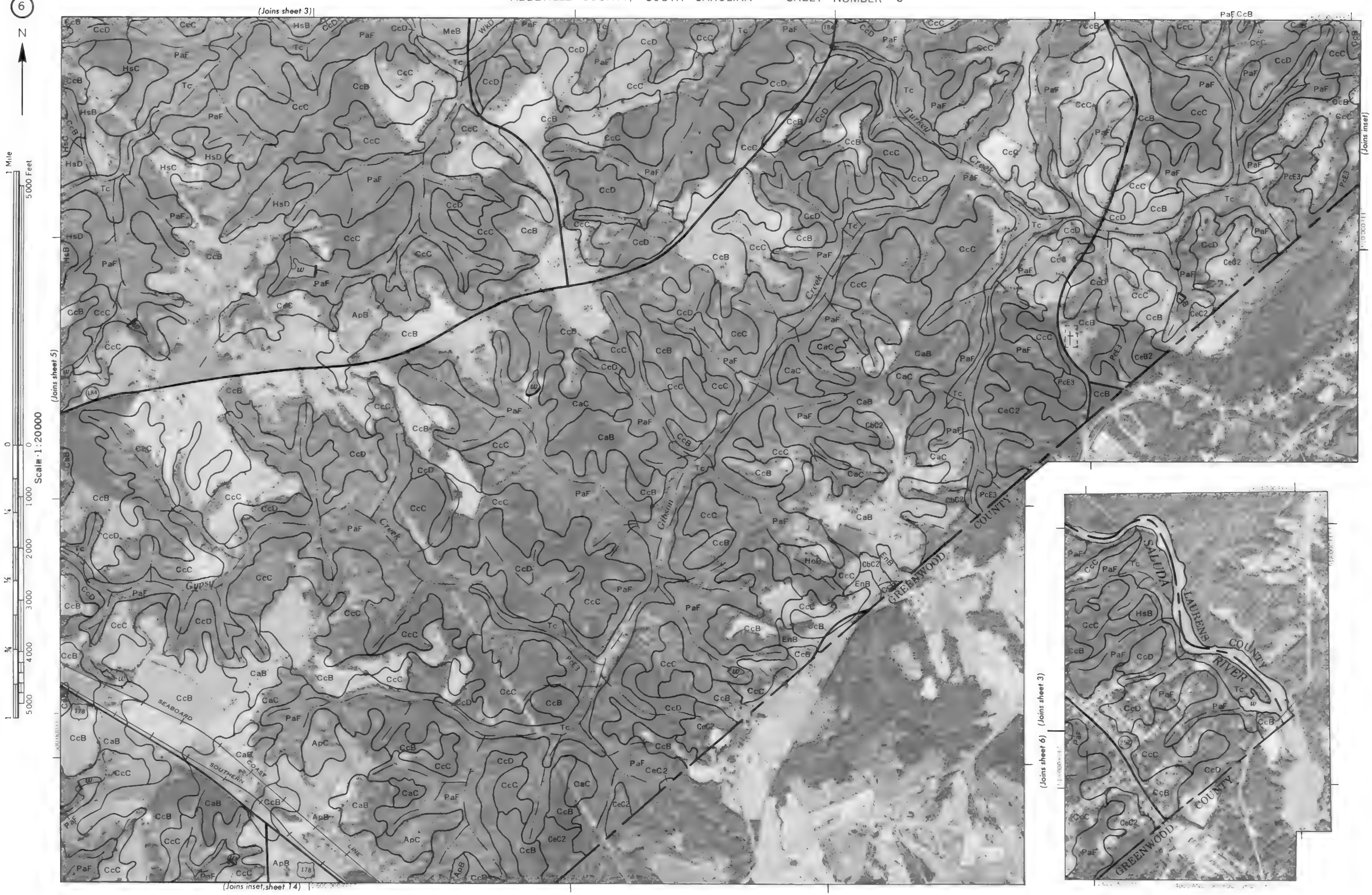

1
N
ANDERSON COUNTY
LAURENS COUNTY
SALUDA
RIVER
Little
Creek
Broad
Creek
Mouth
(Joins inset, sheet 10)
(Joins sheet 3)
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
MaD
MaB
MaC
Tc
CcC
PaF
CcB
HsC
CcD
HsB
HsD
BuB
PcE3
MaF
WkF

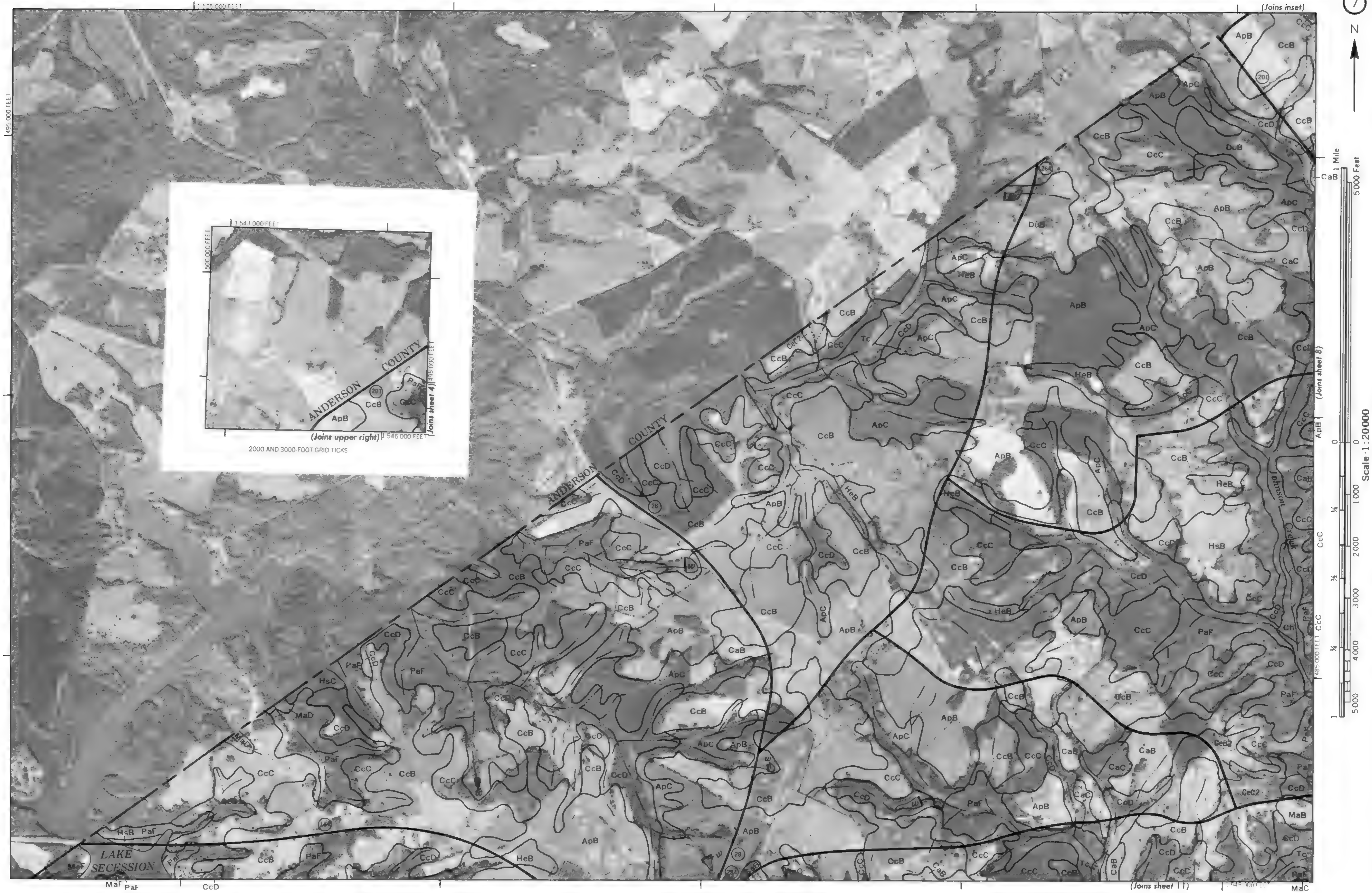

2
N
1 Mile
5000 Feet
Scale 1:20000
(Joins inset, sheet 10)
(Joins sheet 3)
(Joins sheet 5)
(Joins inset, sheet 4)
ANDERSON COUNTY
Ashley
Airfield
SEABOARD
SOUTHERN
COAST
Legion
Lake
Turkey
Creek
Murray
Creek
Corner
Creek
Hogskin
Creek
178
252


3
N
(Joins sheet 1)
(Joins sheet 2)
(Joins sheet 6)
(Joins inset, sheet 6)
SALUDA
LAURENS COUNTY
RIVER
Turkey
Creek
Goose
Creek
Riverside
Sub-division
WARE
SHOALS
1 Mile
5000 Feet
Scale 1:20000

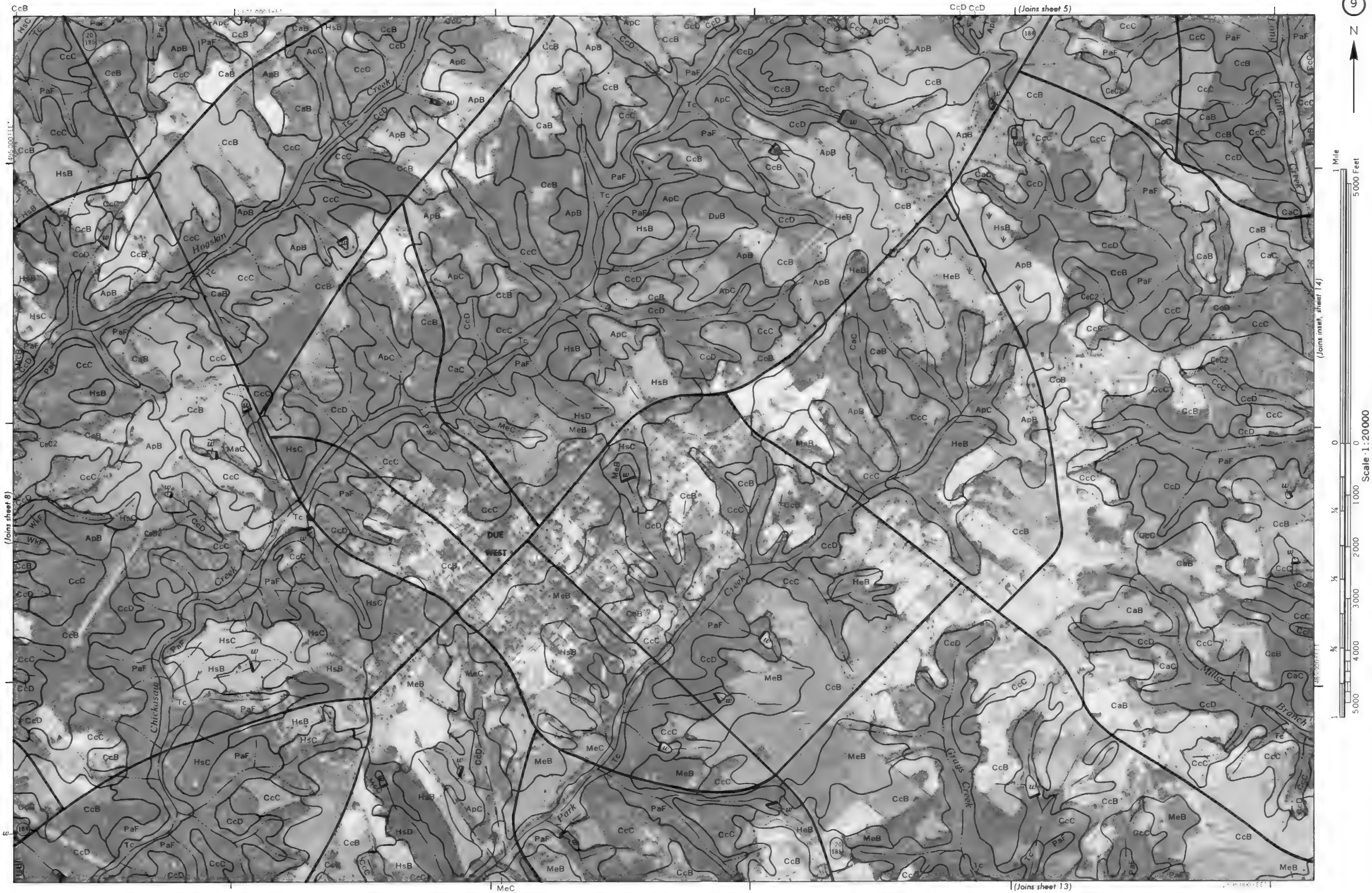

4
N
1 Mile
5000 Feet
Scale 1:20000
3000 AND 4000-FOOT GRID TICKS
1 571 000 FEET
ANDERSON COUNTY
(Joins upper right)
(Joins inset, sheet 2)
(Joins inset)
LITTLE RIVER
Corner Creek
Long Branch
Hawskin Creek
(Joins sheet 5)
(Joins sheet 8)
(Joins inset, sheet 7)

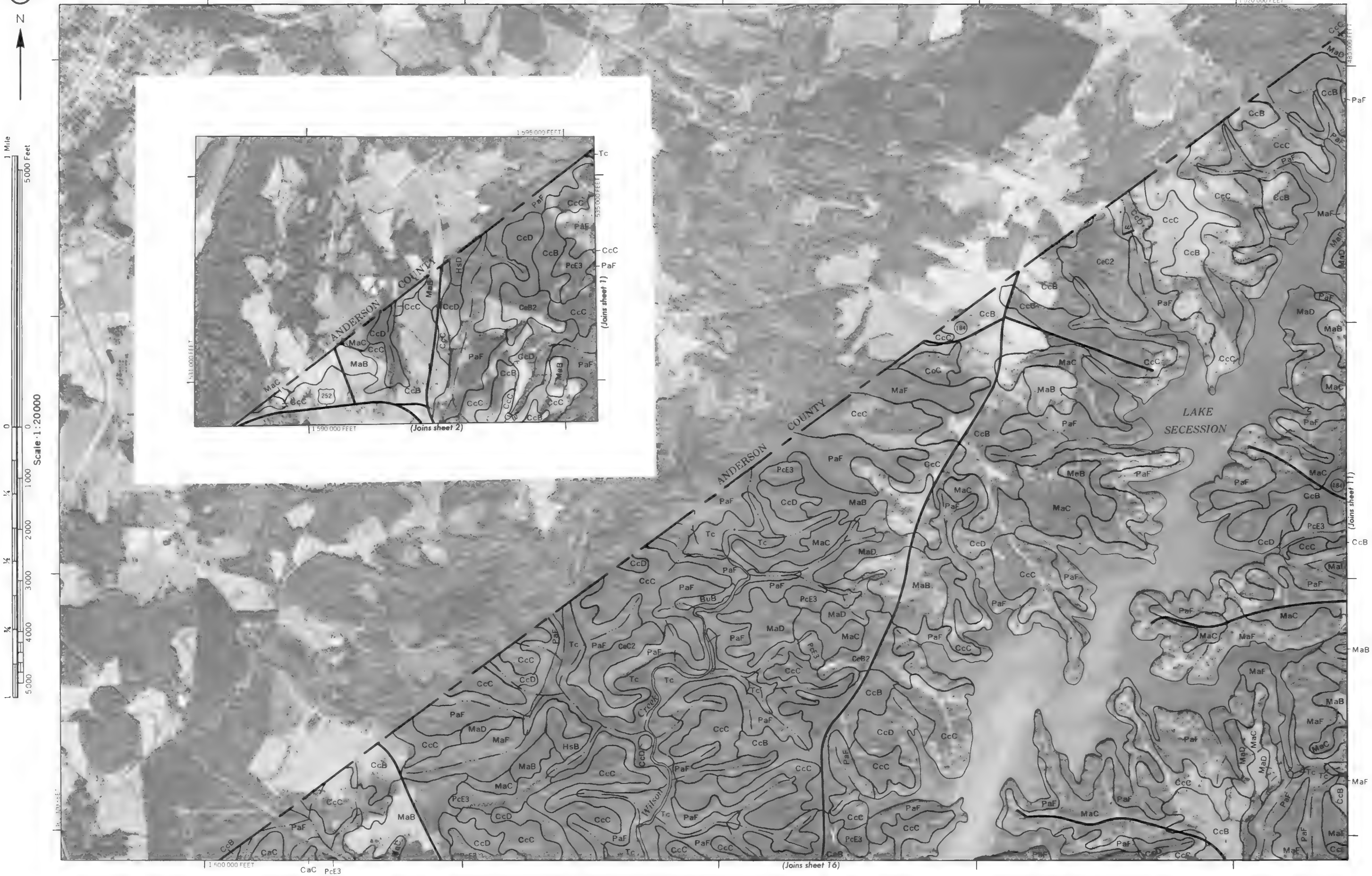

5
N
(Joins sheet 2)
(Joins sheet 4)
(Joins sheet 6)
(Joins sheet 9)
1 Mile
5000 Feet
Scale 1:20000
Donalds
SEABOARD
COAST
SOUTHERN
LINE
Goose Creek
Little Hogskin Creek
Hogskin Creek
Chickasaw
Long Cane Creek
water
184
178


6
N
(Joins sheet 3)
(Joins sheet 5)
(Joins inset)
(Joins inset, sheet 14)
(Joins sheet 6)
(Joins sheet 3)
1 Mile
5000 Feet
Scale 1:20000
Turkey Creek
Gibson Creek
Gypsy
Creek
GREENWOOD COUNTY
SEABOARD COAST LINE
SOUTHERN
SALUDA RIVER
LAURENS COUNTY
GREENWOOD COUNTY

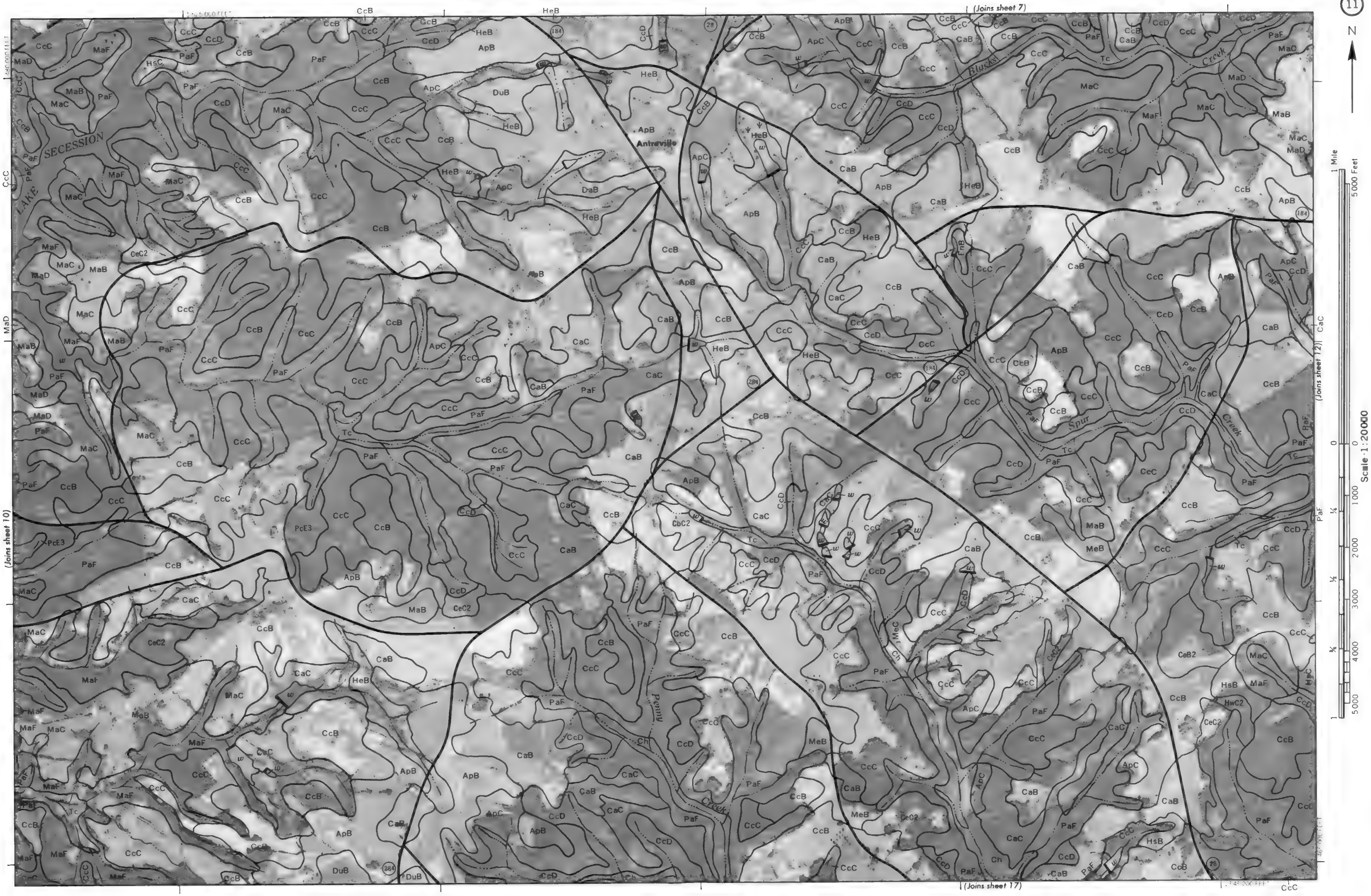

7
N
(Joins inset)
(Joins sheet 8)
(Joins sheet 11)
ANDERSON COUNTY
ANDERSON COUNTY
(Joins upper right)
(Joins sheet 4)
2000 AND 3000-FOOT GRID TICKS
1 543 000 FEET
1 546 000 FEET
500 000 FEET
498 000 FEET
495 000 FEET
485 000 FEET
LAKE SECESSION
Johnson Creek
1 Mile
5000 Feet
Scale 1:20000

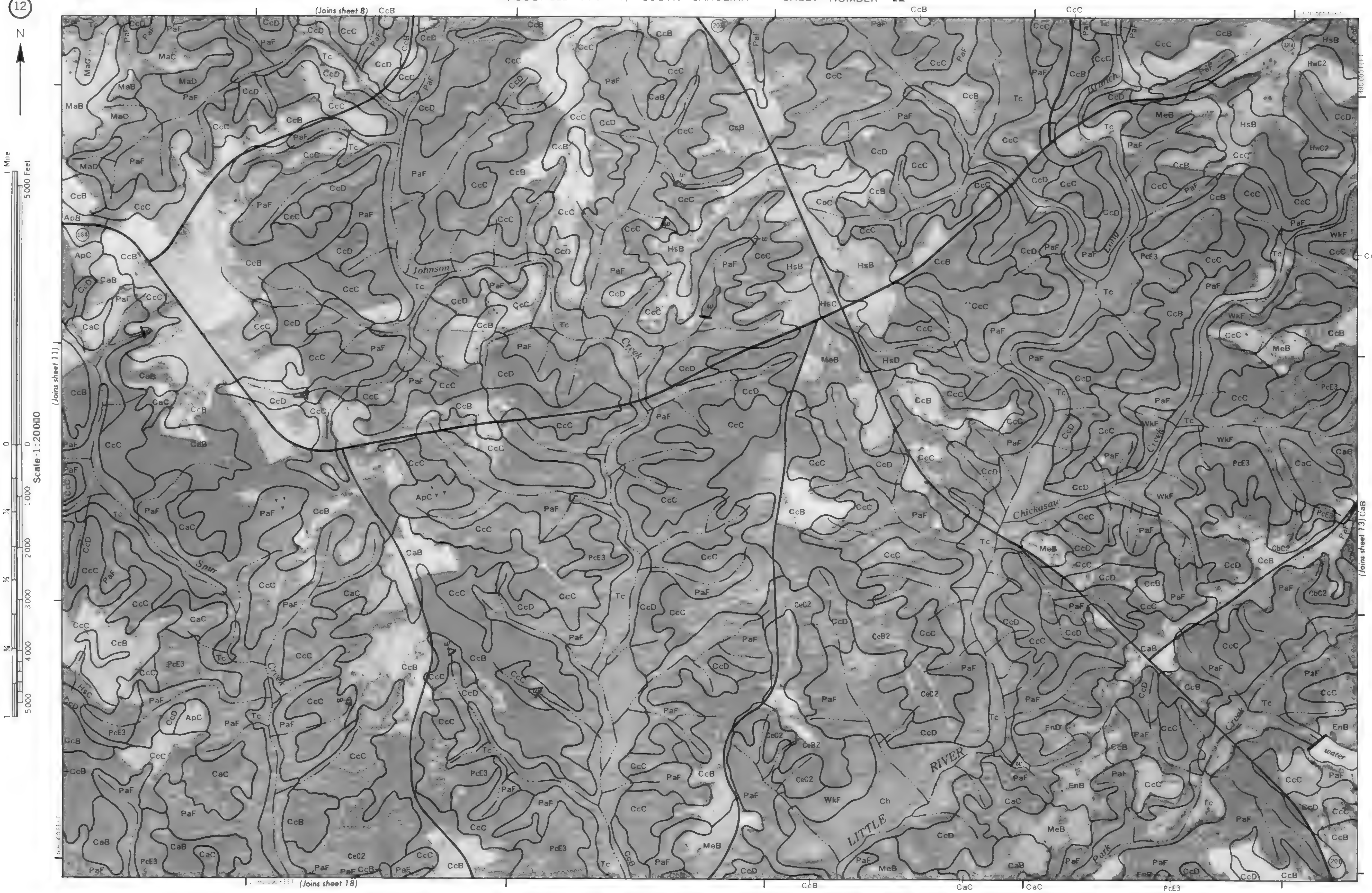

8
N
1 Mile
5000 Feet
Scale 1:20000
(Joins sheet 4)
(Joins sheet 7)
(Joins sheet 9)
(Joins sheet 12)
Level Land
LITTLE
RIVER
Johnson Creek
Long Branch
Hogskin Creek
Little Hogskin
Blacks Creek
Creek
Branch
201
184

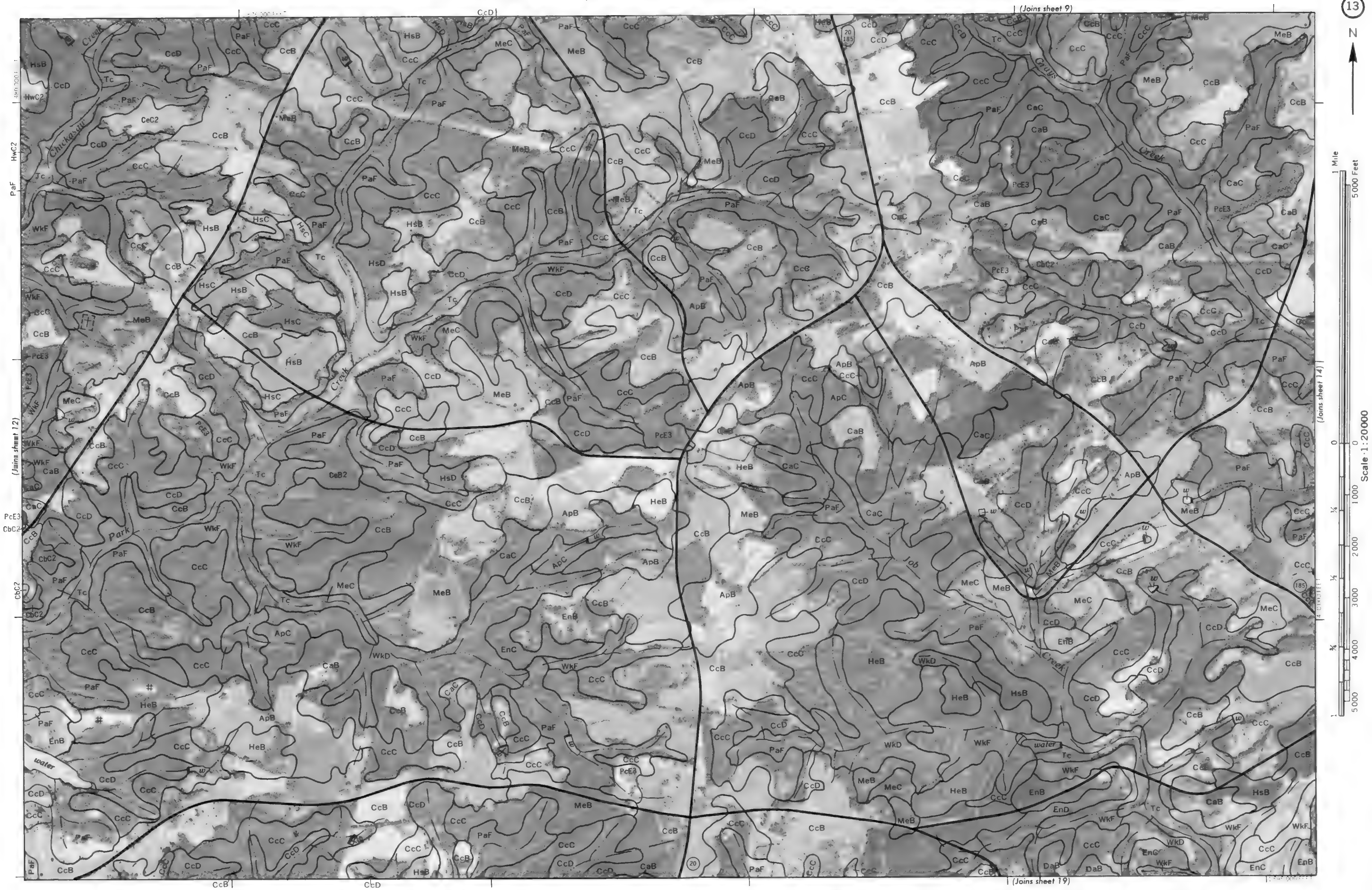

9
N
(Joins sheet 5)
(Joins sheet 8)
(Joins inset, sheet 14)
(Joins sheet 13)
DUE WEST
Hogskin Creek
Chickasaw Creek
Park Creek
Grays Creek
Miller Branch
Scale 1:20000
1 Mile
5000 Feet
0
¼
½
¾
1000
2000
3000
4000
5000


N
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
1 595 000 FEET
1 590 000 FEET
1 520 000 FEET
1 500 000 FEET
ANDERSON COUNTY
(Joins sheet 1)
(Joins sheet 2)
LAKE SECESSION
Wilson Creek
(Joins sheet 11)
(Joins sheet 16)
252
184

11

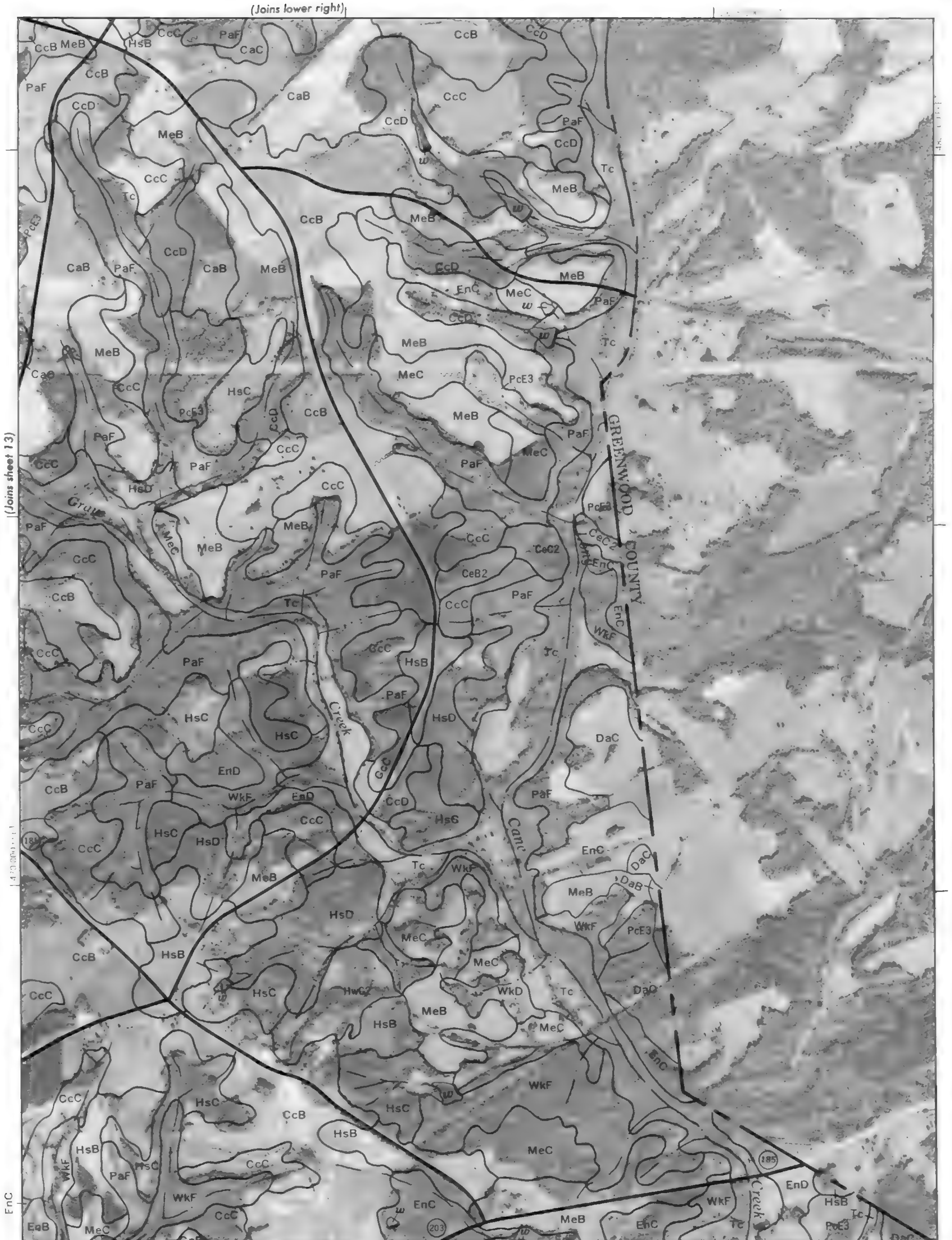

(Joins sheet 7)
(Joins sheet 10)
(Joins sheet 12)
(Joins sheet 17)
LAKE SECESSION
Antreville
Blacks Creek
Spur Creek
Penny Creek
N
1 Mile
5000 Feet
Scale 1:20000

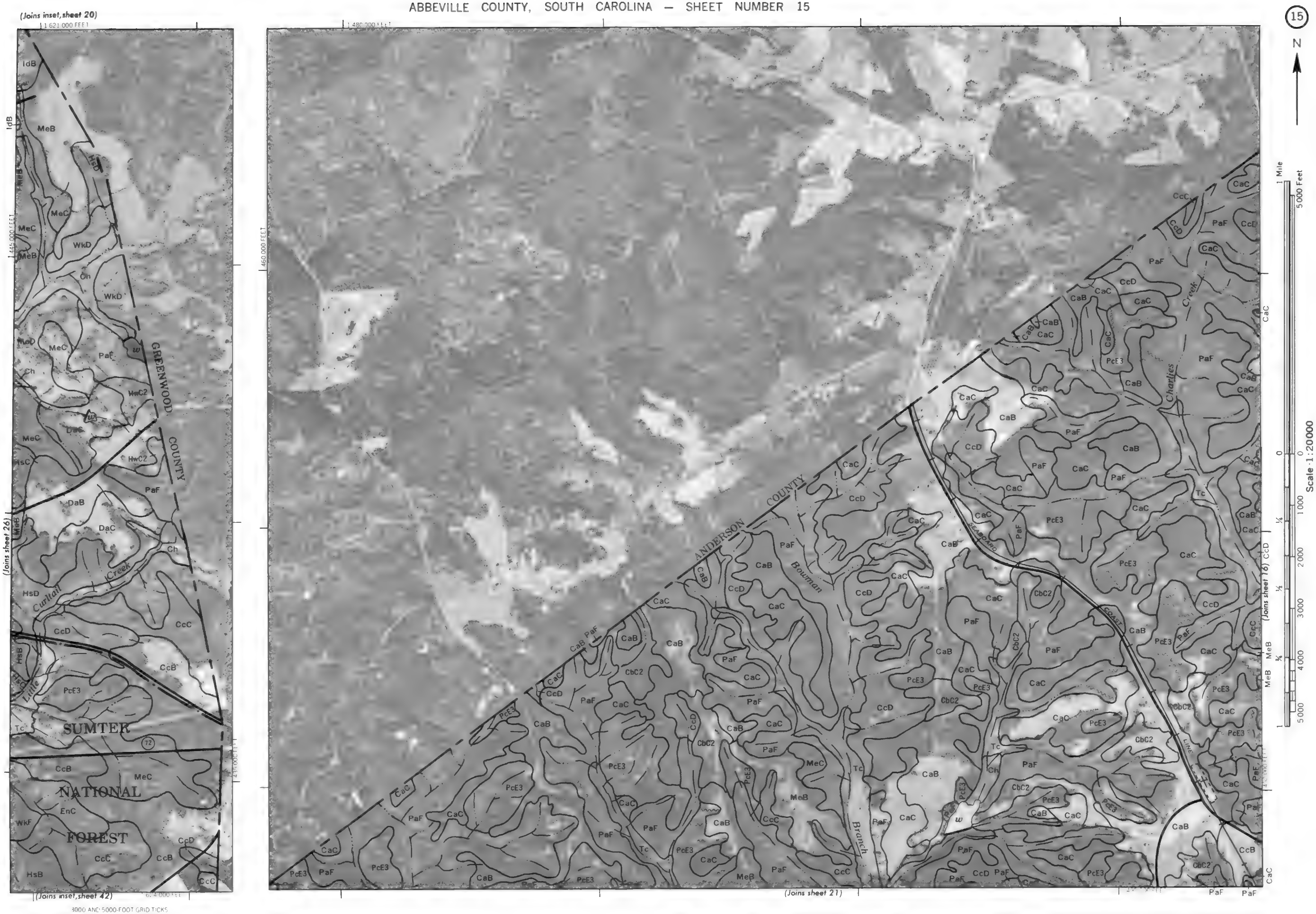

12
N
(Joins sheet 8)
(Joins sheet 11)
(Joins sheet 13)
(Joins sheet 18)
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1
Johnson
Creek
Branch
Long
Creek
Chickasaw
Spur
Creek
LITTLE
RIVER
Creek
Park
water
184
203

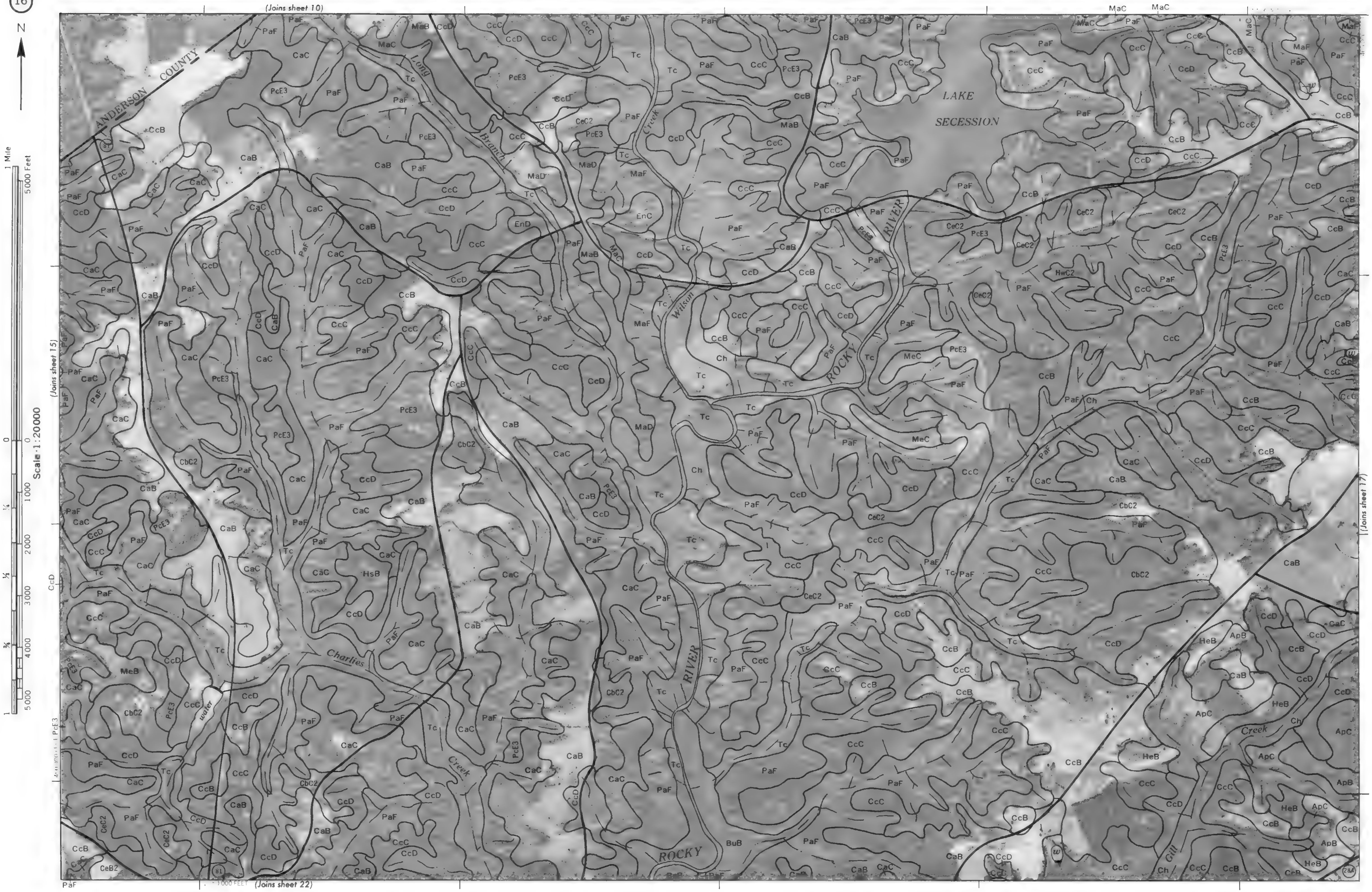

13
N
(Joins sheet 9)
(Joins sheet 14)
(Joins sheet 19)
(Joins sheet 12)
Chickasaw Creek
Park Creek
Grays Creek
Job Creek
water
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000

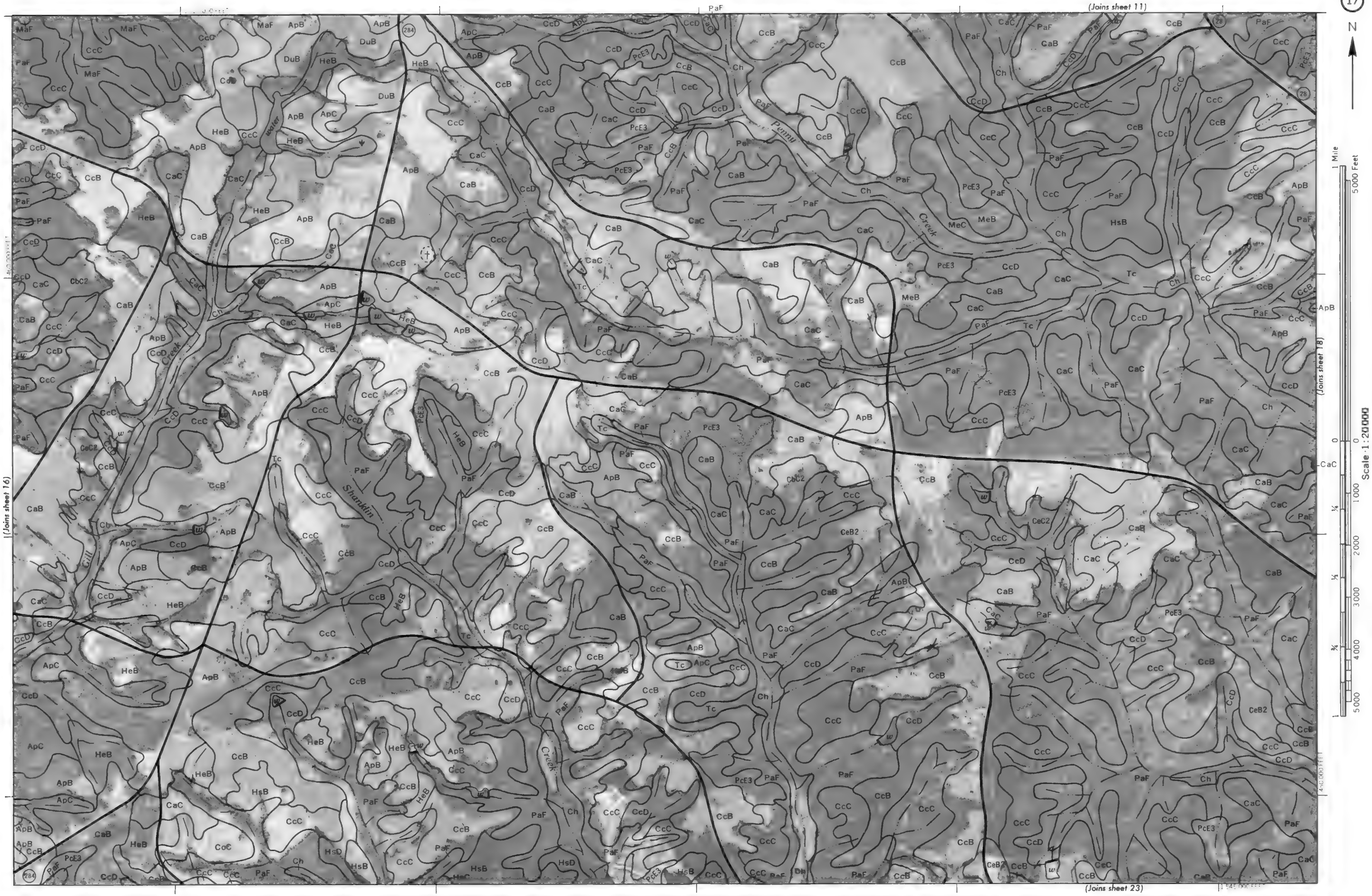
N

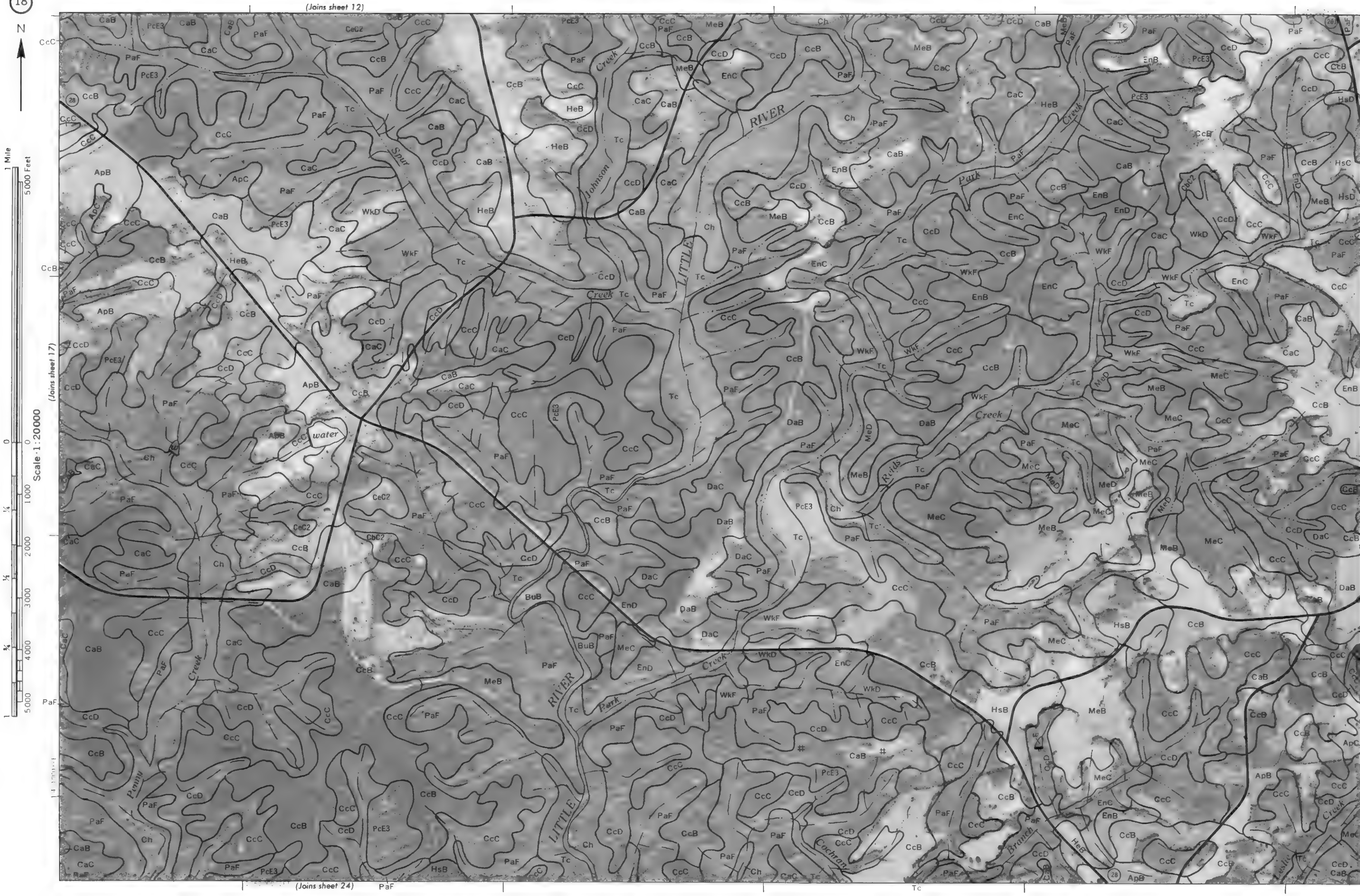
1 Mile
5000 Feet
Scale 1:20000
0 ¼ ½ ¾ 1
0 1000 2000 3000 4000 5000

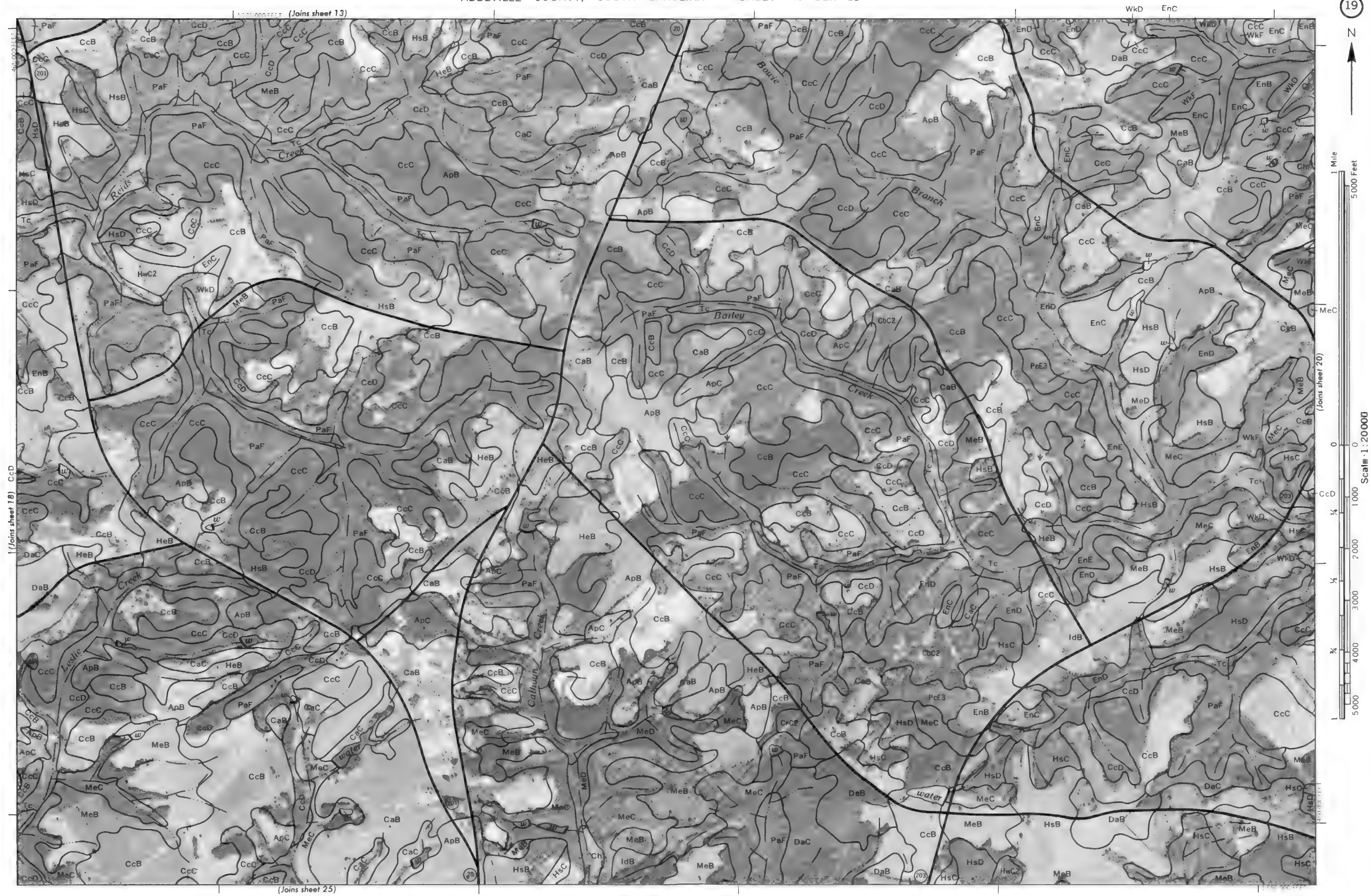


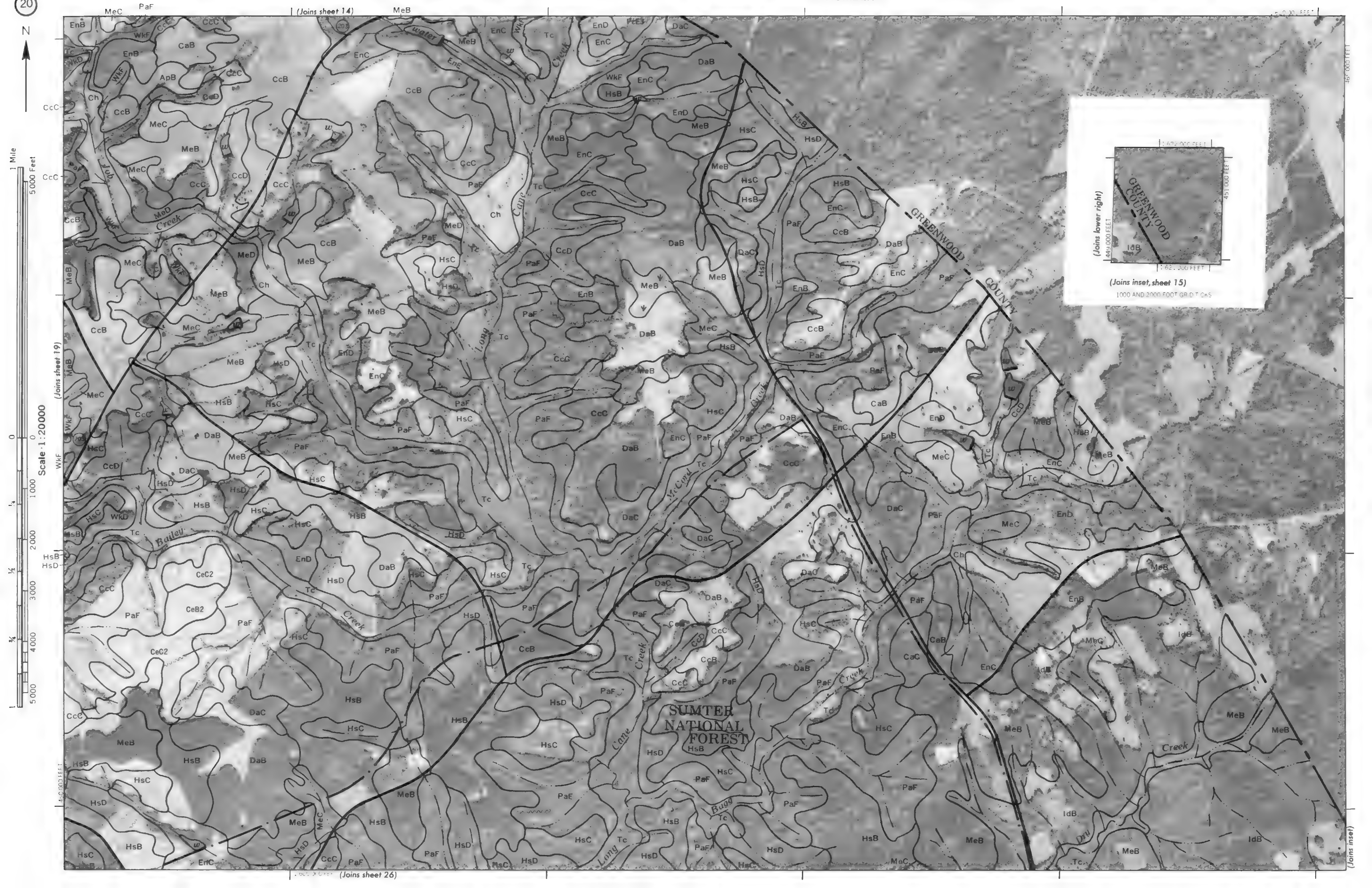

15
N
(Joins inset, sheet 20)
GREENWOOD COUNTY
Curltail Creek
Little
SUMTER
NATIONAL
FOREST
(Joins sheet 26)
(Joins inset, sheet 42)
3000 AND 5000-FOOT GRID TICKS
ANDERSON COUNTY
Bowman Branch
Charlies Creek
SEABOARD COAST LINE
(Joins sheet 16)
(Joins sheet 21)
1 Mile
5000 Feet
Scale 1:20000

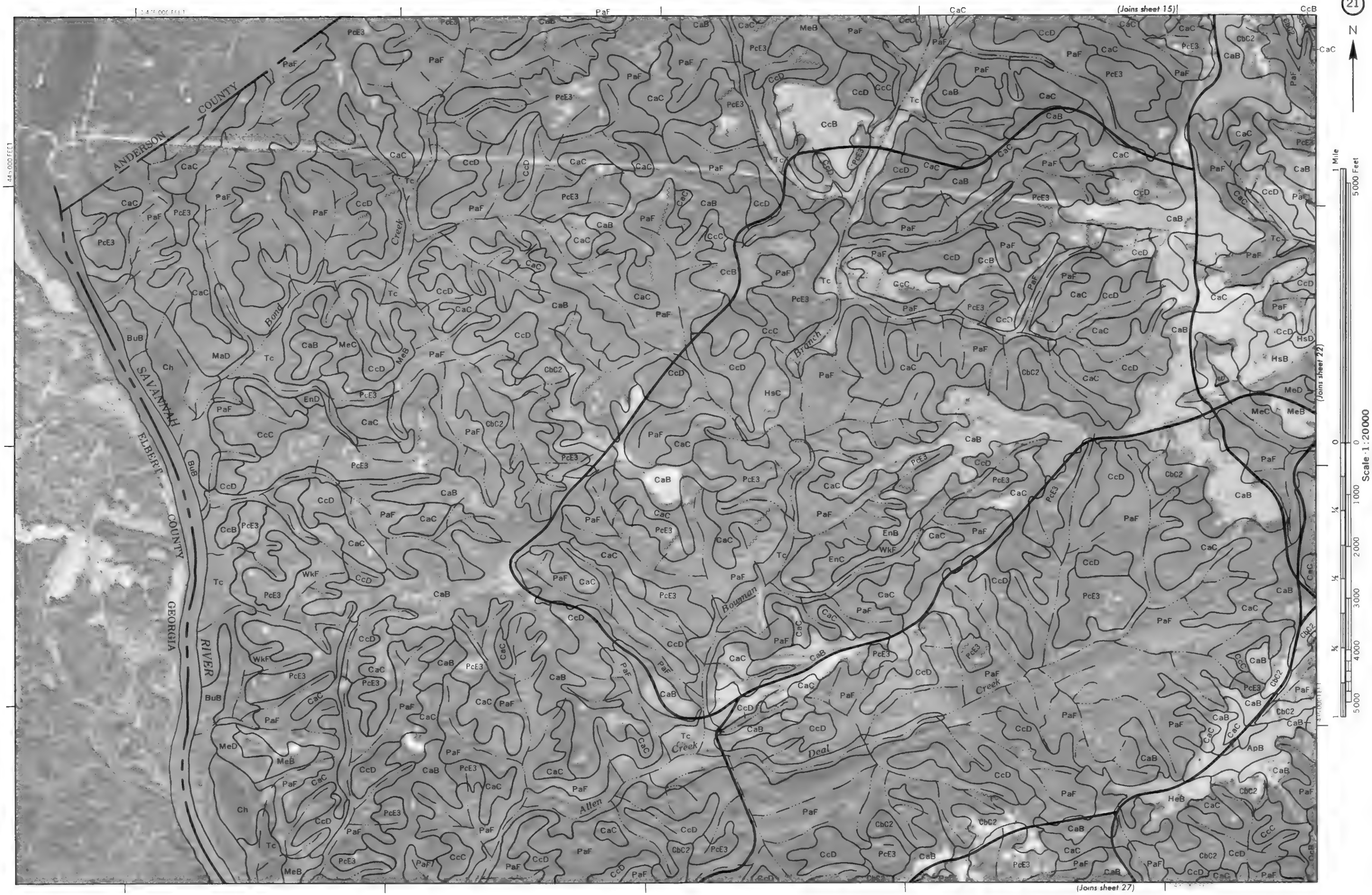

16
N
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
(Joins sheet 10)
(Joins sheet 15)
(Joins sheet 17)
(Joins sheet 22)
ANDERSON COUNTY
LAKE
SECESSION
Long
Branch
Creek
Wilson
ROCKY
RIVER
Charlies
Creek
Gill
Creek
water


17
N
(Joins sheet 11)
(Joins sheet 16)
(Joins sheet 18)
(Joins sheet 23)
Penny Creek
Shanklin Creek
Gill Creek
Creek
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
284
28

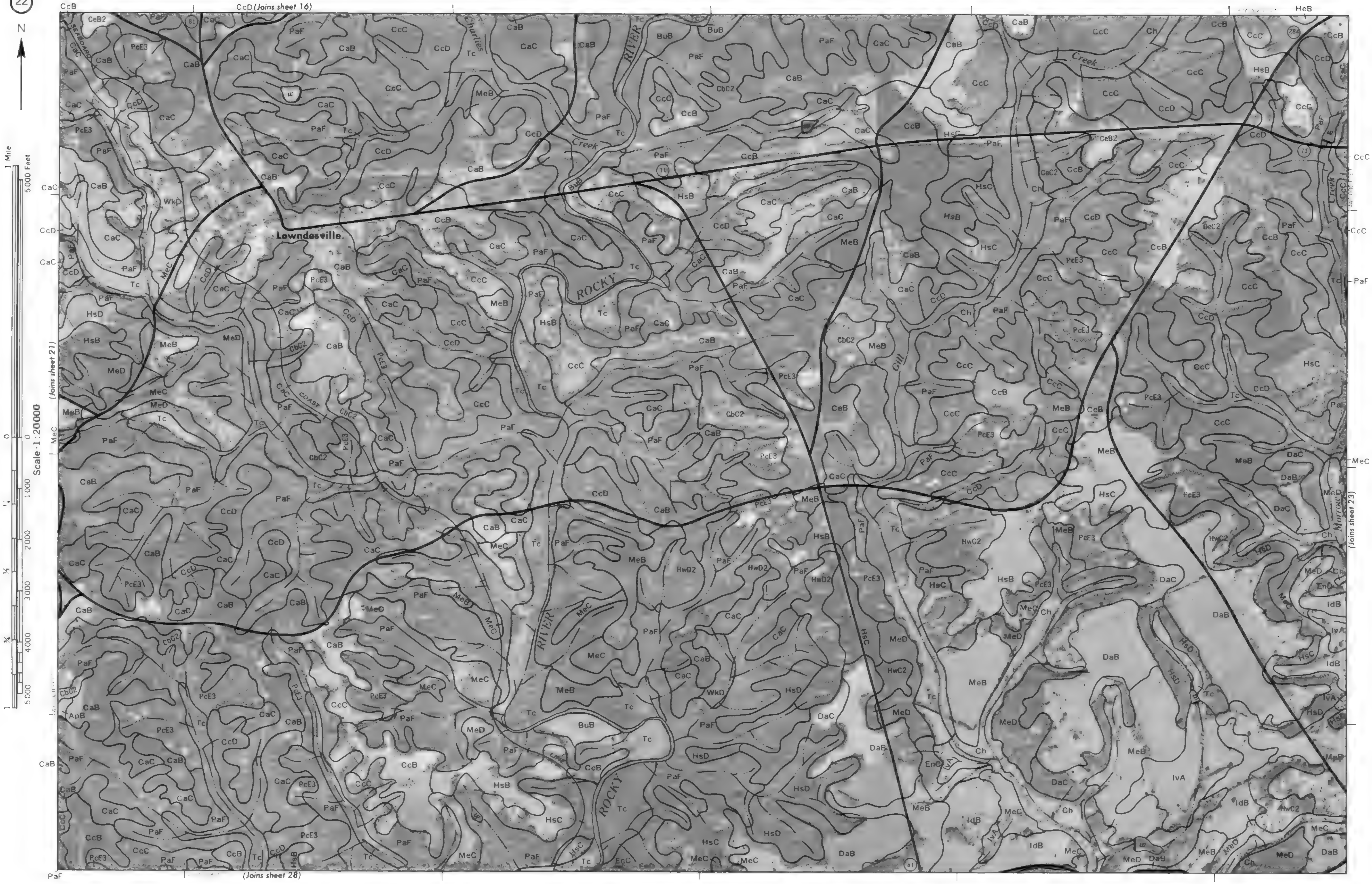

(Joins sheet 12)
(Joins sheet 17)
(Joins sheet 19)
(Joins sheet 24)
N
Scale 1:20000
1 Mile
5000 Feet
LITTLE RIVER
Johnson Creek
Spur
Park Creek
Reids Creek
Penny Creek
Cochran Branch
water

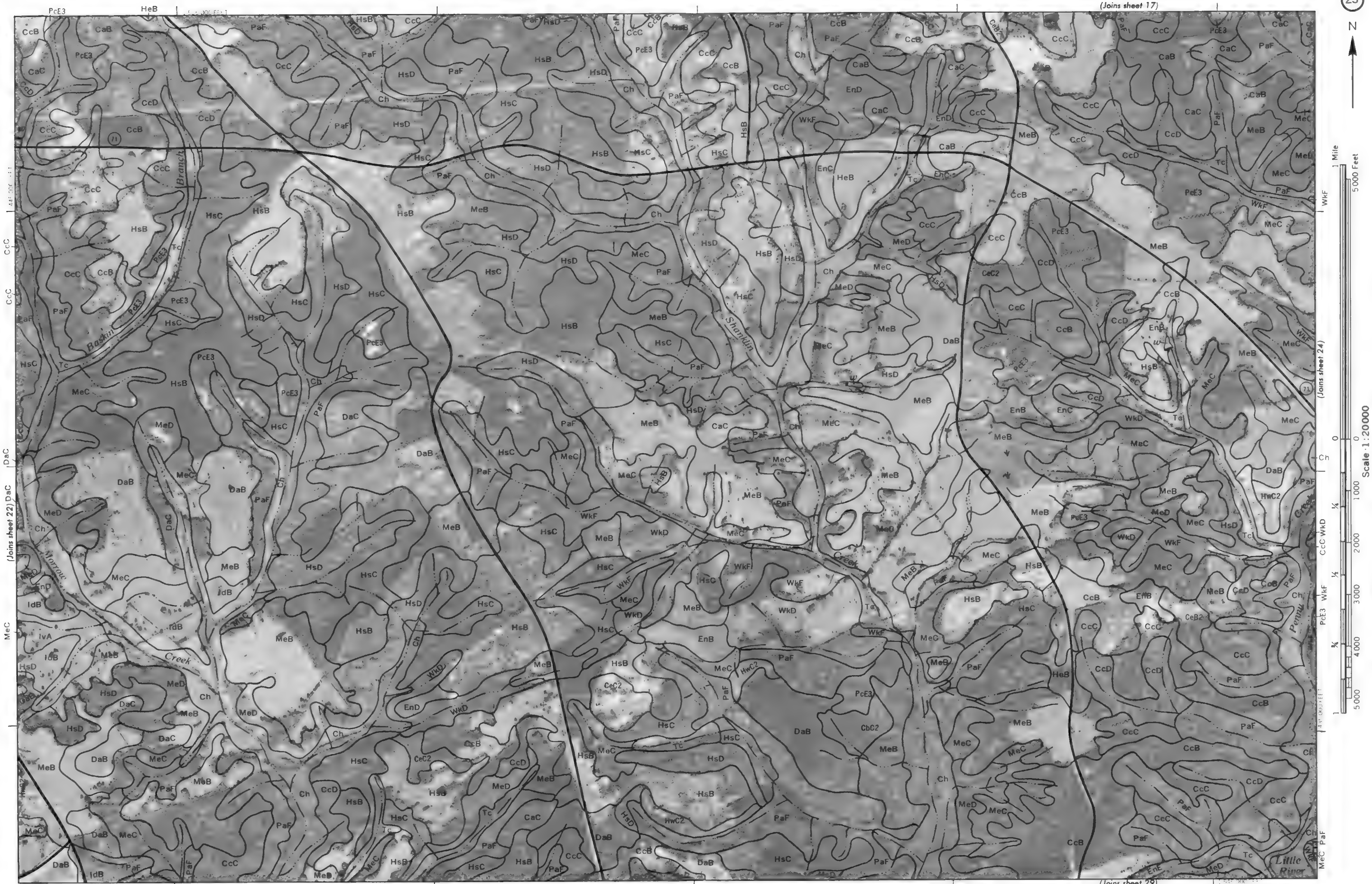

19
N
(Joins sheet 13)
(Joins sheet 18)
(Joins sheet 20)
(Joins sheet 25)
Reids Creek
Bowie Branch
Bailey Creek
Leslie Creek
Calhoun Creek
water
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1

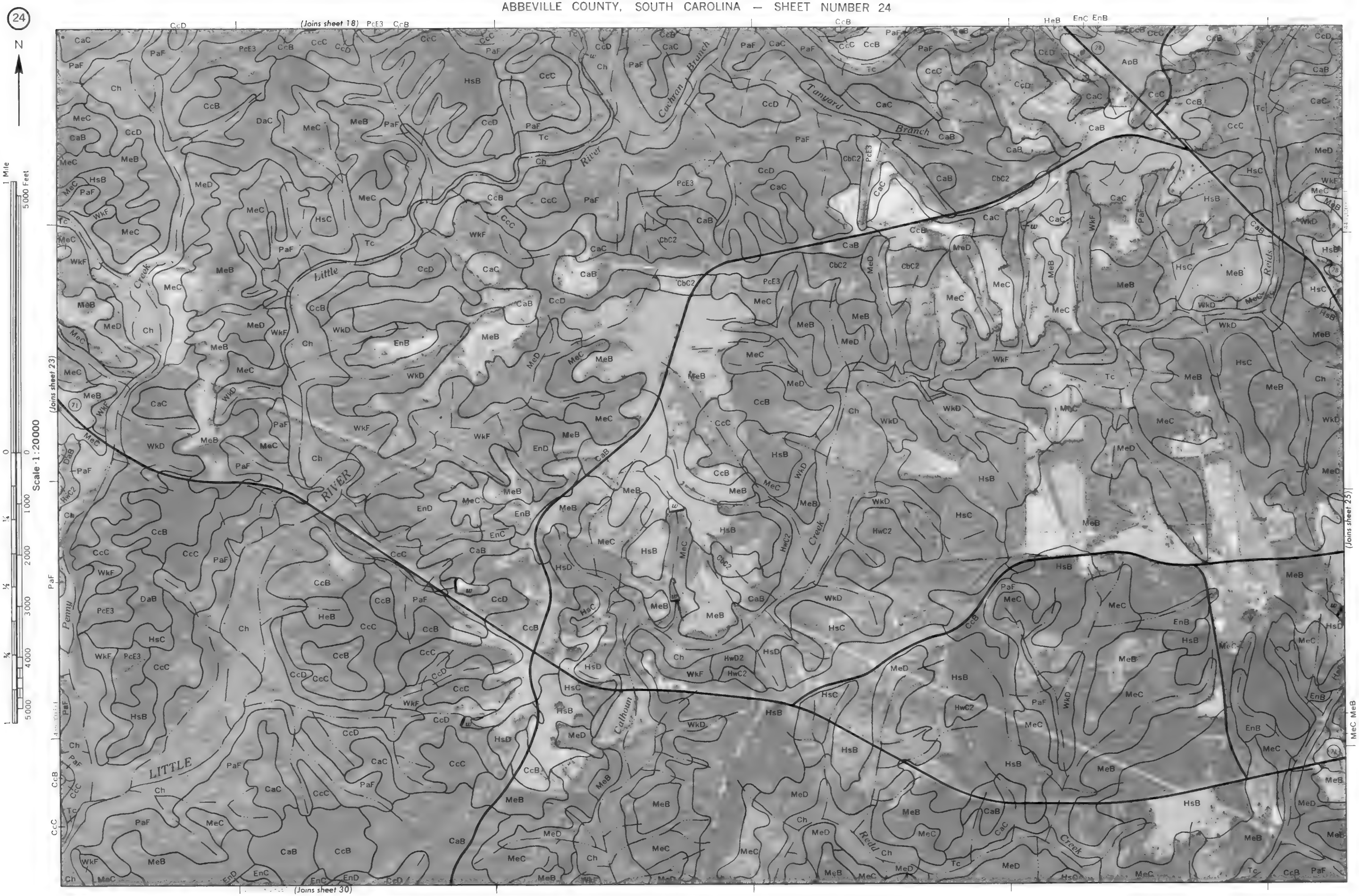

20
N
(Joins sheet 14)
(Joins sheet 19)
(Joins sheet 26)
(Joins inset)
Scale 1:20000
1 Mile
5000 Feet
GREENWOOD COUNTY
SUMTER NATIONAL FOREST
Long Cane Creek
Bailey Creek
McCord Creek
Bugg Creek
(Joins lower right)
(Joins inset, sheet 15)
1000 AND 2000 FOOT GRID TICKS

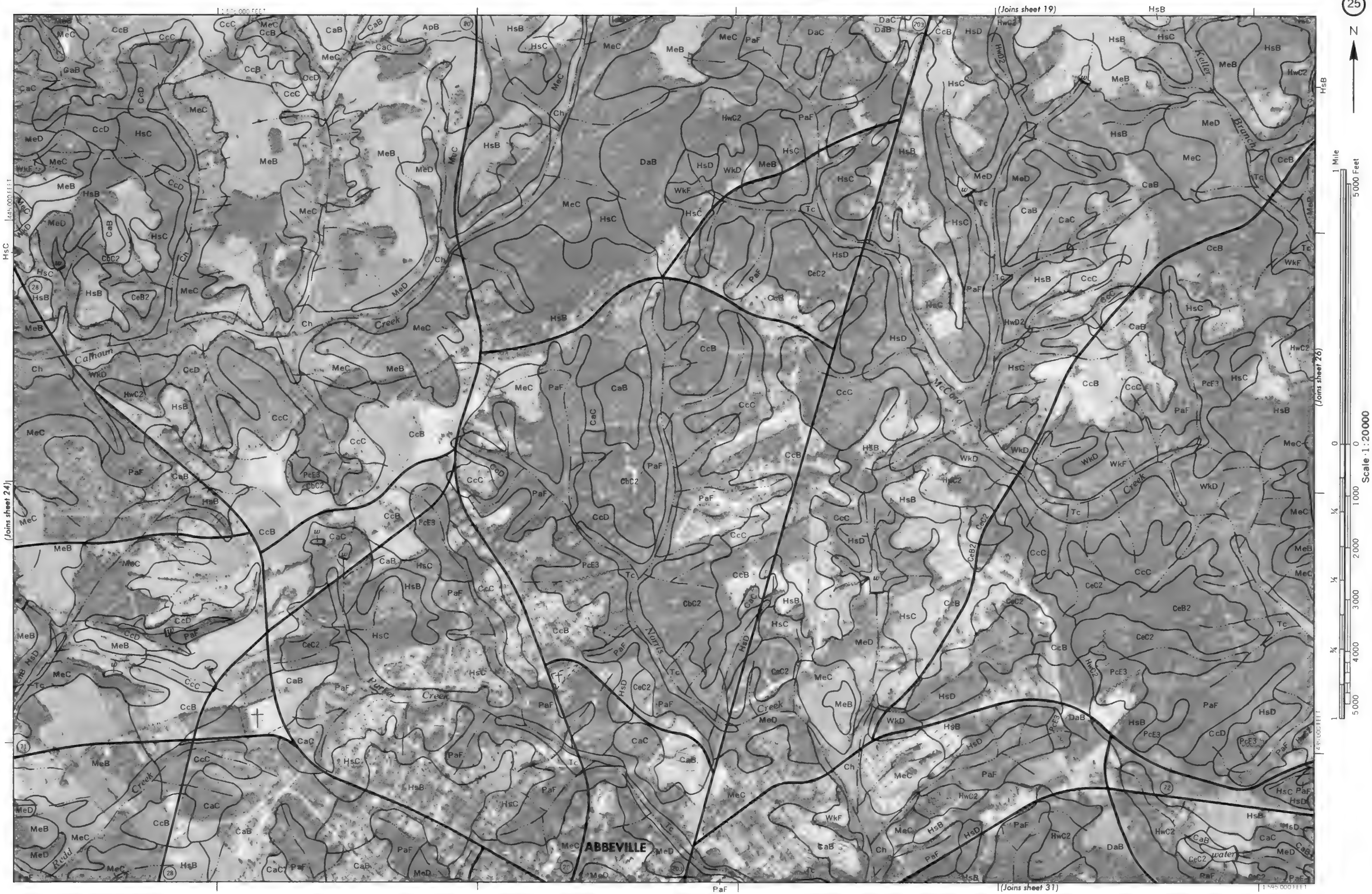

21
N
(Joins sheet 15)
(Joins sheet 22)
(Joins sheet 27)
ANDERSON COUNTY
SAVANNAH RIVER
ELBERT COUNTY GEORGIA
Bond Creek
Branch
Bowman Creek
Deal Creek
Allen Creek
Scale 1:20000
1 Mile
5000 Feet
0
1/4
1/2
3/4
1
1000
2000
3000
4000
5000

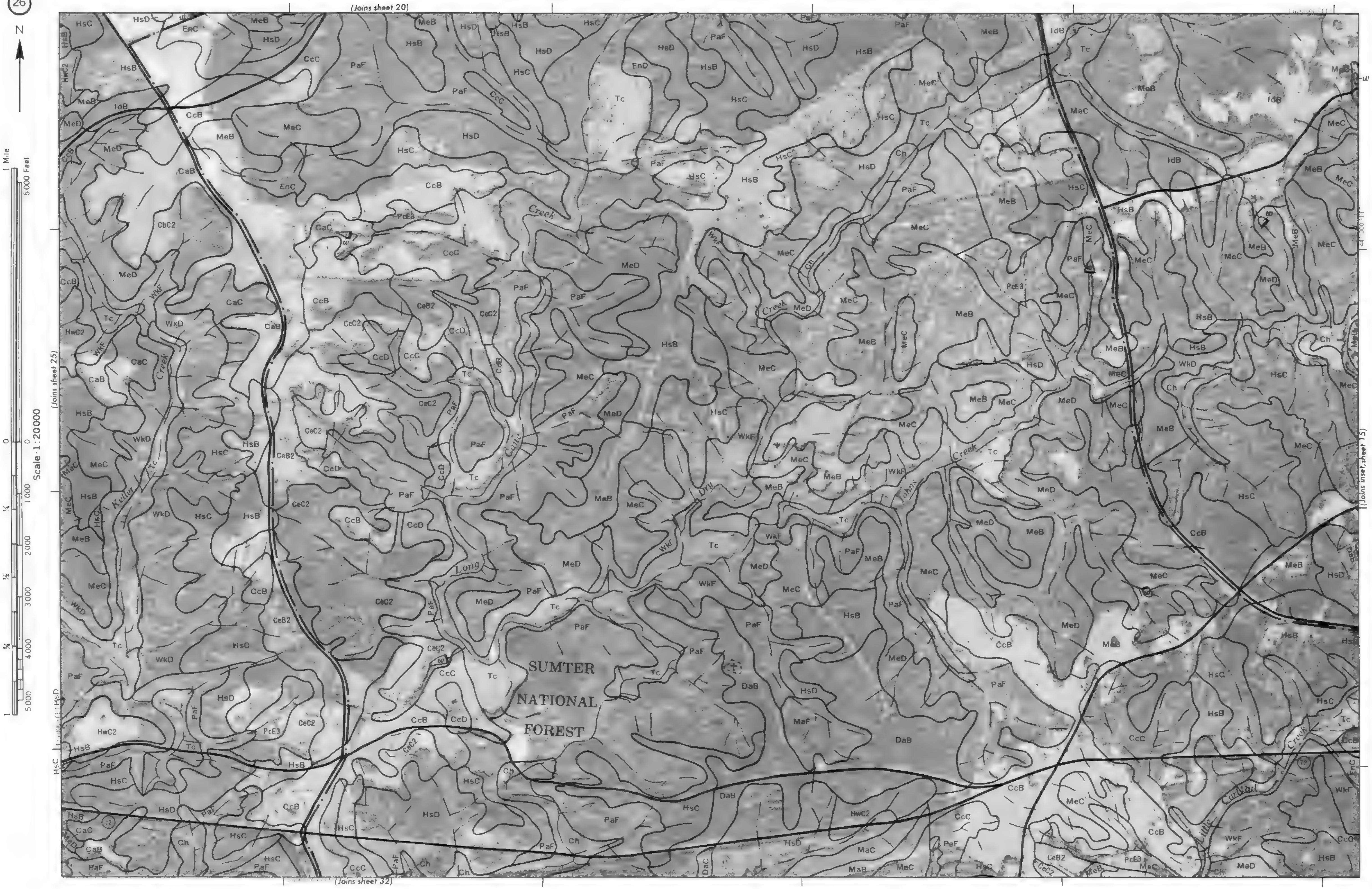
ABBEVILLE COUNTY, SOUTH CAROLINA — SHEET NUMBER 22

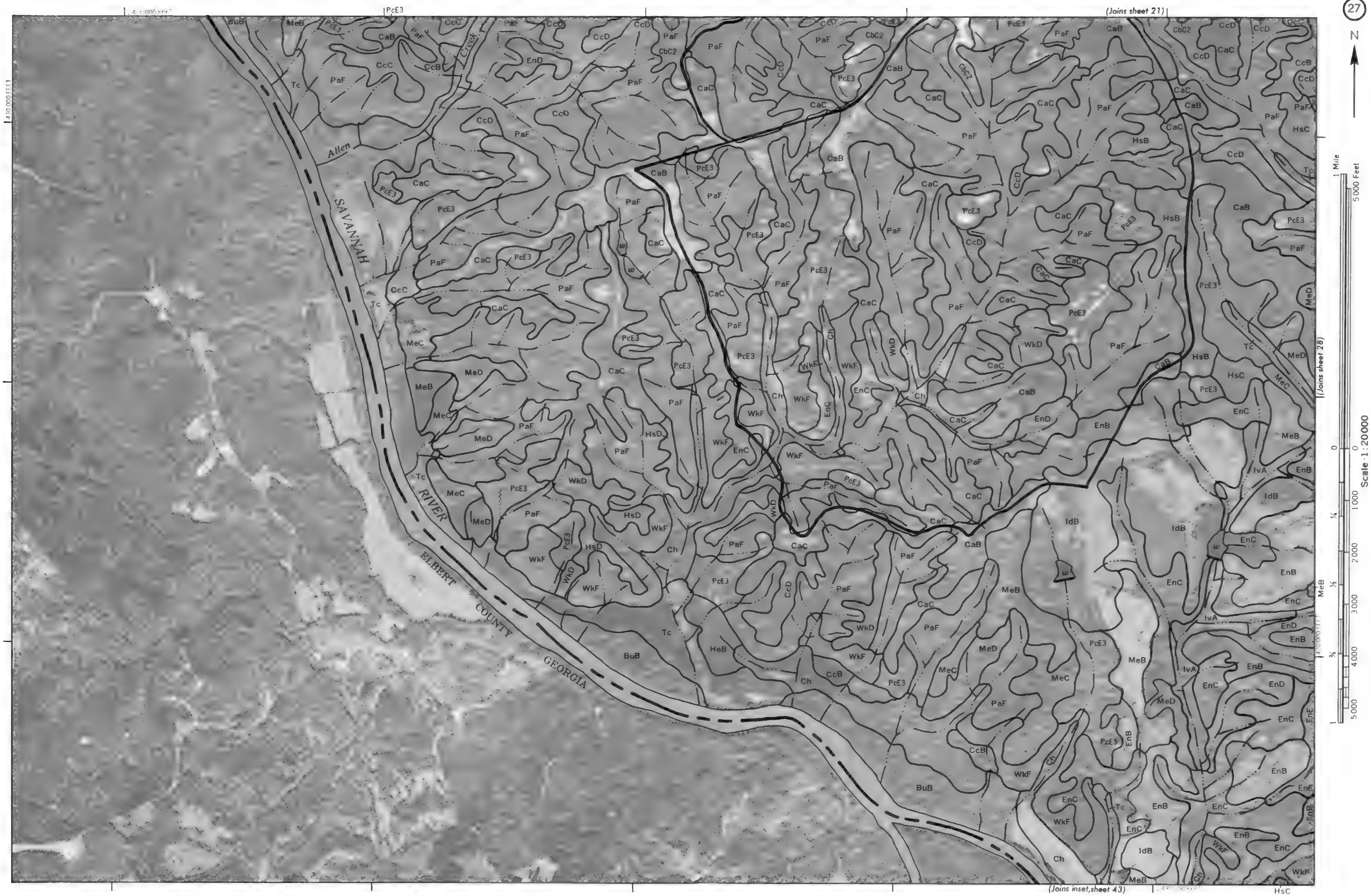


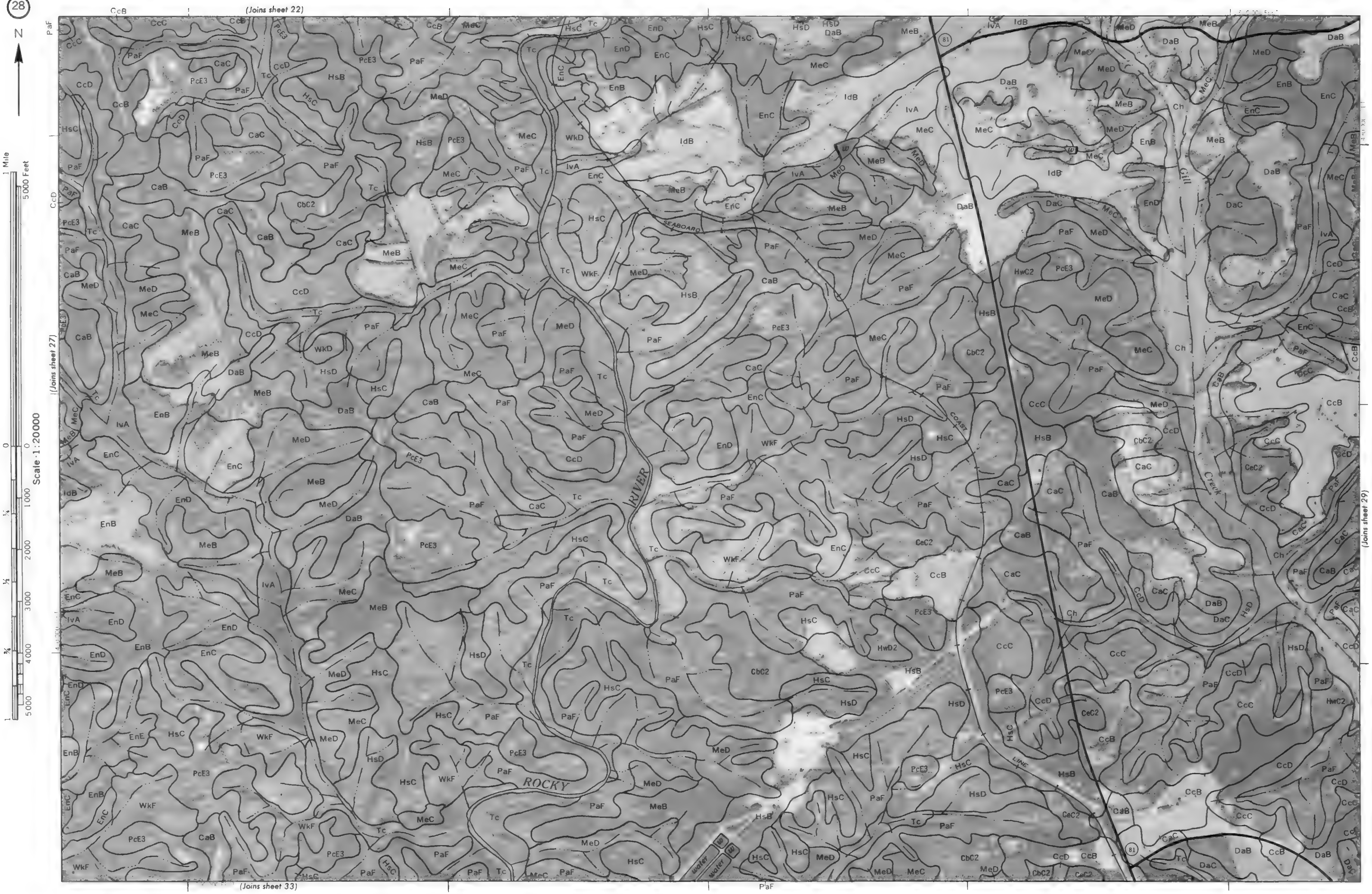

23
N
(Joins sheet 17)
(Joins sheet 24)
(Joins sheet 22)
(Joins sheet 29)
Scale 1:20000
1 Mile
5000 Feet
Baskin Branch
Morrow Creek
Shanklin Creek
Penny Creek
Little River

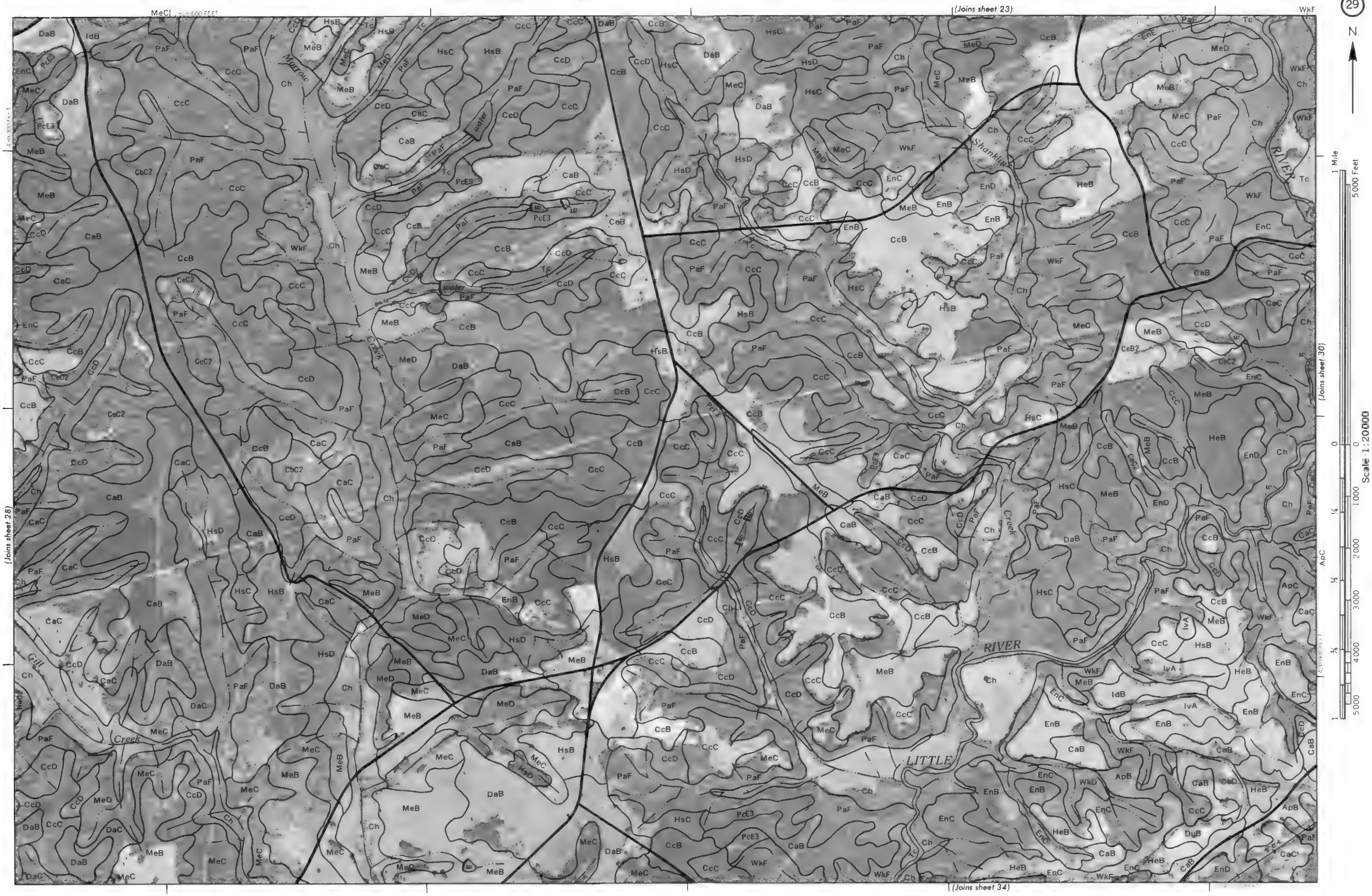

24
N
1 Mile
5 000 Feet
Scale 1:20000
(Joins sheet 18)
(Joins sheet 23)
(Joins sheet 25)
(Joins sheet 30)
Cochran Branch
Tanyard Branch
Little River
LITTLE RIVER
Reids Creek
Calhoun Creek
Penny Creek
Redd Creek

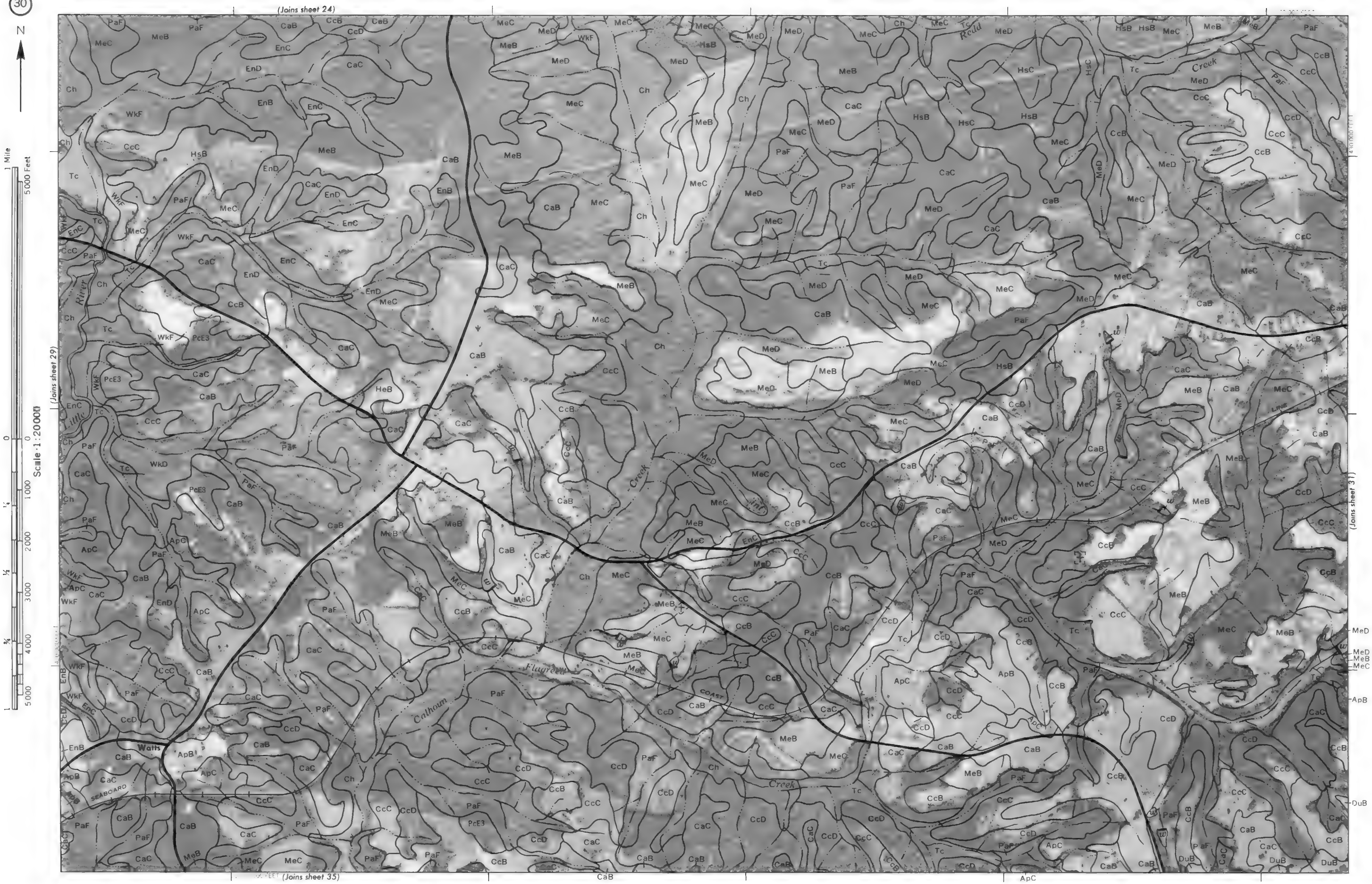

25
N
(Joins sheet 19)
(Joins sheet 26)
(Joins sheet 31)
(Joins sheet 24)
ABBEVILLE
Calhoun
Creek
McCord
Creek
Keller
Branch
Norris
Creek
Parker
Creek
Redd
Creek
water
1 Mile
5000 Feet
Scale 1:20000


N
(Joins sheet 20)
(Joins sheet 25)
(Joins inset, sheet 15)
(Joins sheet 32)
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
SUMTER
NATIONAL
FOREST
Keller Creek
Long Cane Creek
Dry Creek
Johns Creek
Little Curltail Creek

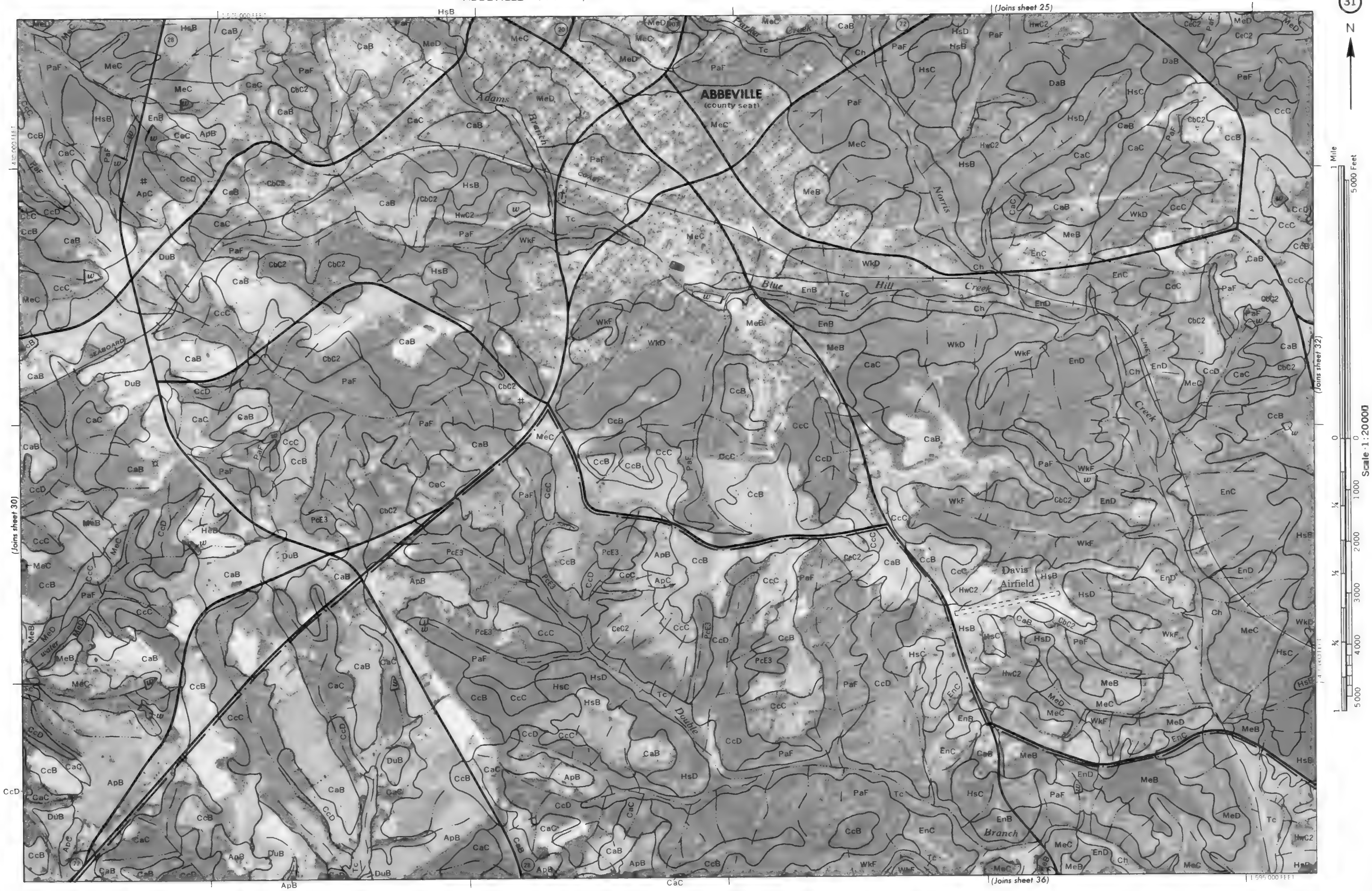

27
N
(Joins sheet 21)
(Joins sheet 28)
(Joins inset, sheet 43)
SAVANNAH
RIVER
ELBERT COUNTY
GEORGIA
Allen
Creek
1 Mile
5000 Feet
Scale 1:20000
0
¼
½
¾
1
0
1000
2000
3000
4000
5000

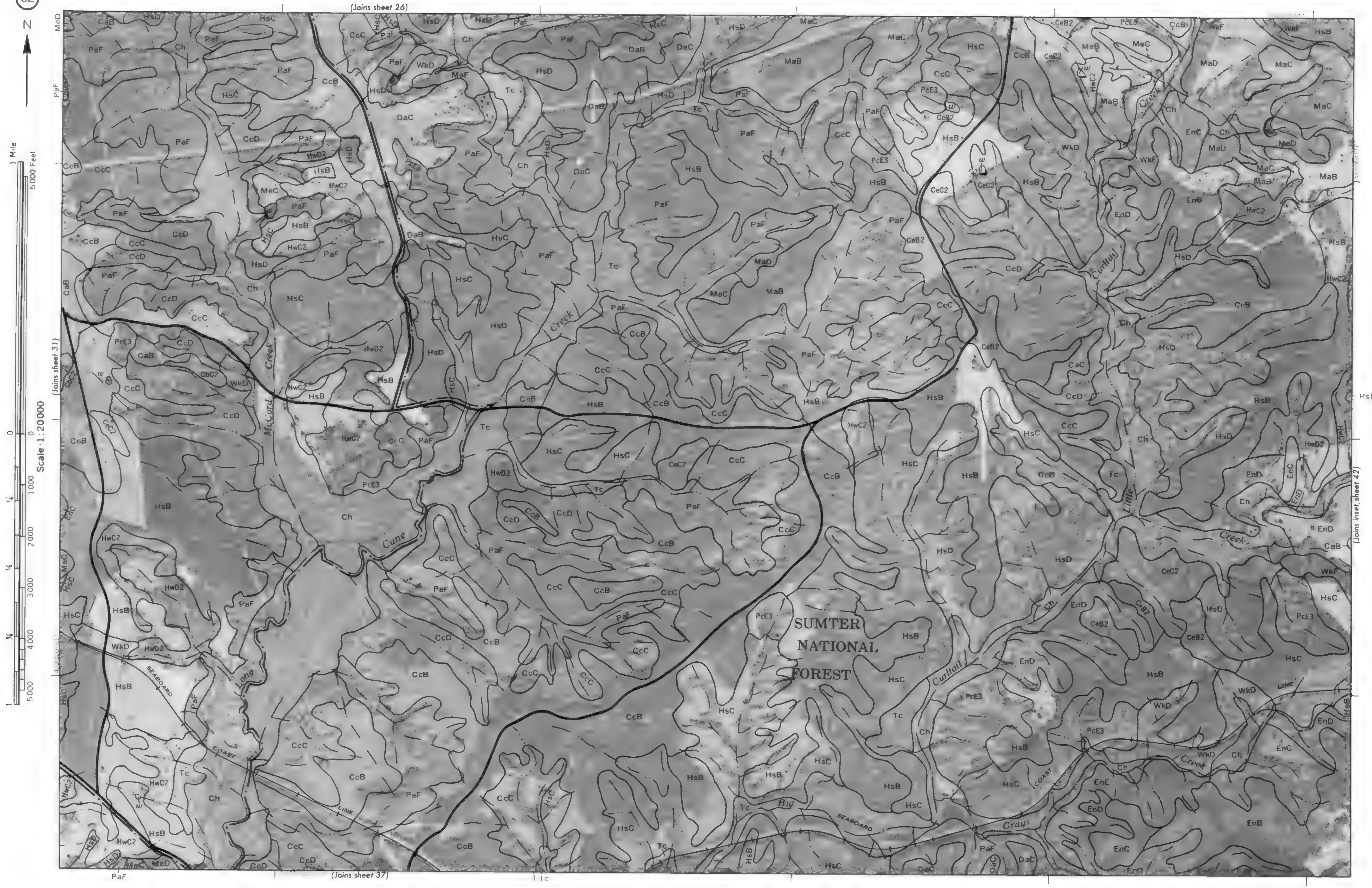

28
N
(Joins sheet 22)
(Joins sheet 27)
(Joins sheet 29)
(Joins sheet 33)
Scale 1:20000
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
ROCKY
RIVER
SEABOARD
COAST
LINE
Gill
Creek
81

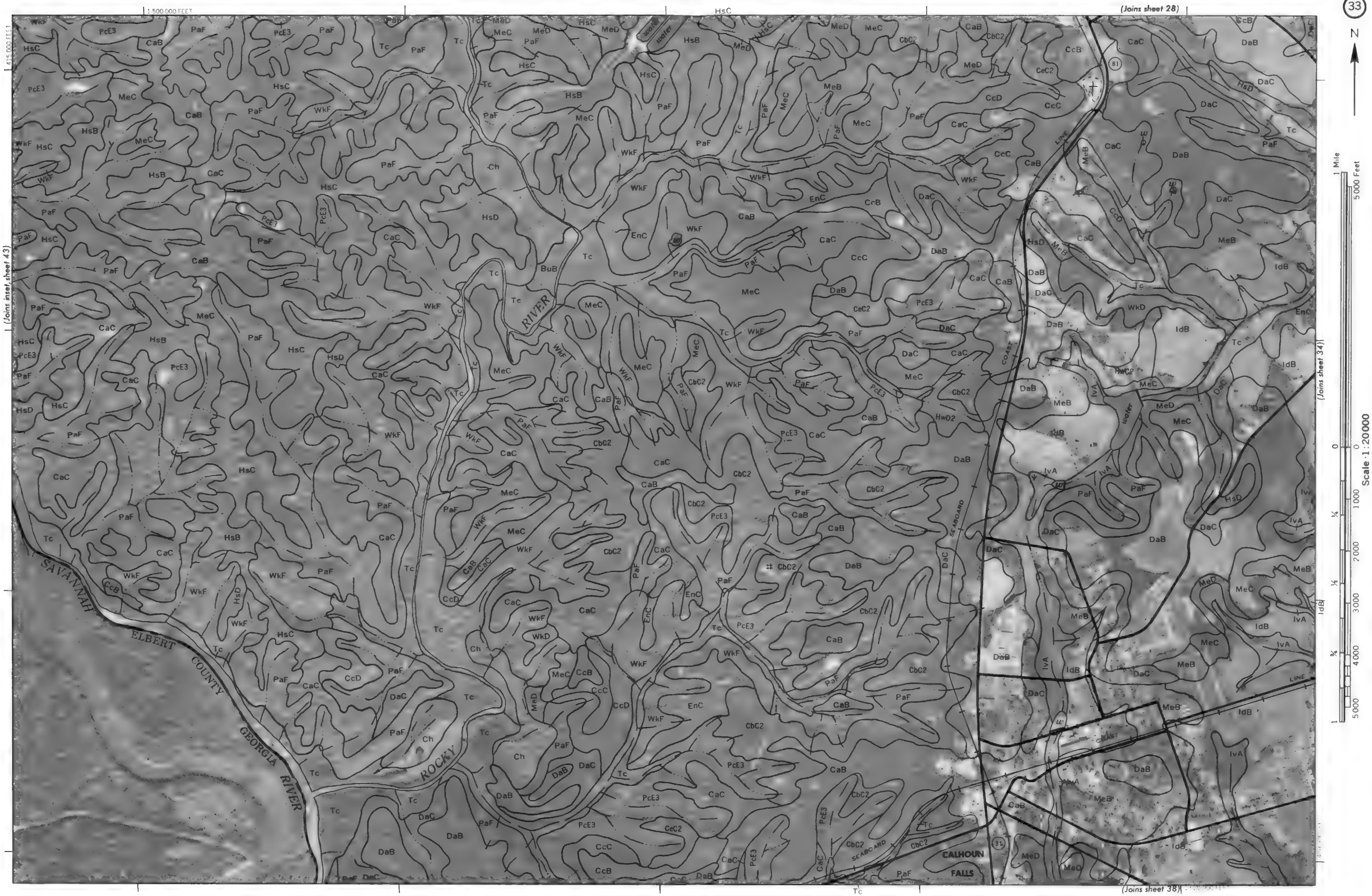

29
N
(Joins sheet 23)
(Joins sheet 28)
(Joins sheet 30)
(Joins sheet 34)
Morrow Creek
Shanklin
Gill Creek
Creek
LITTLE RIVER
RIVER
water
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000

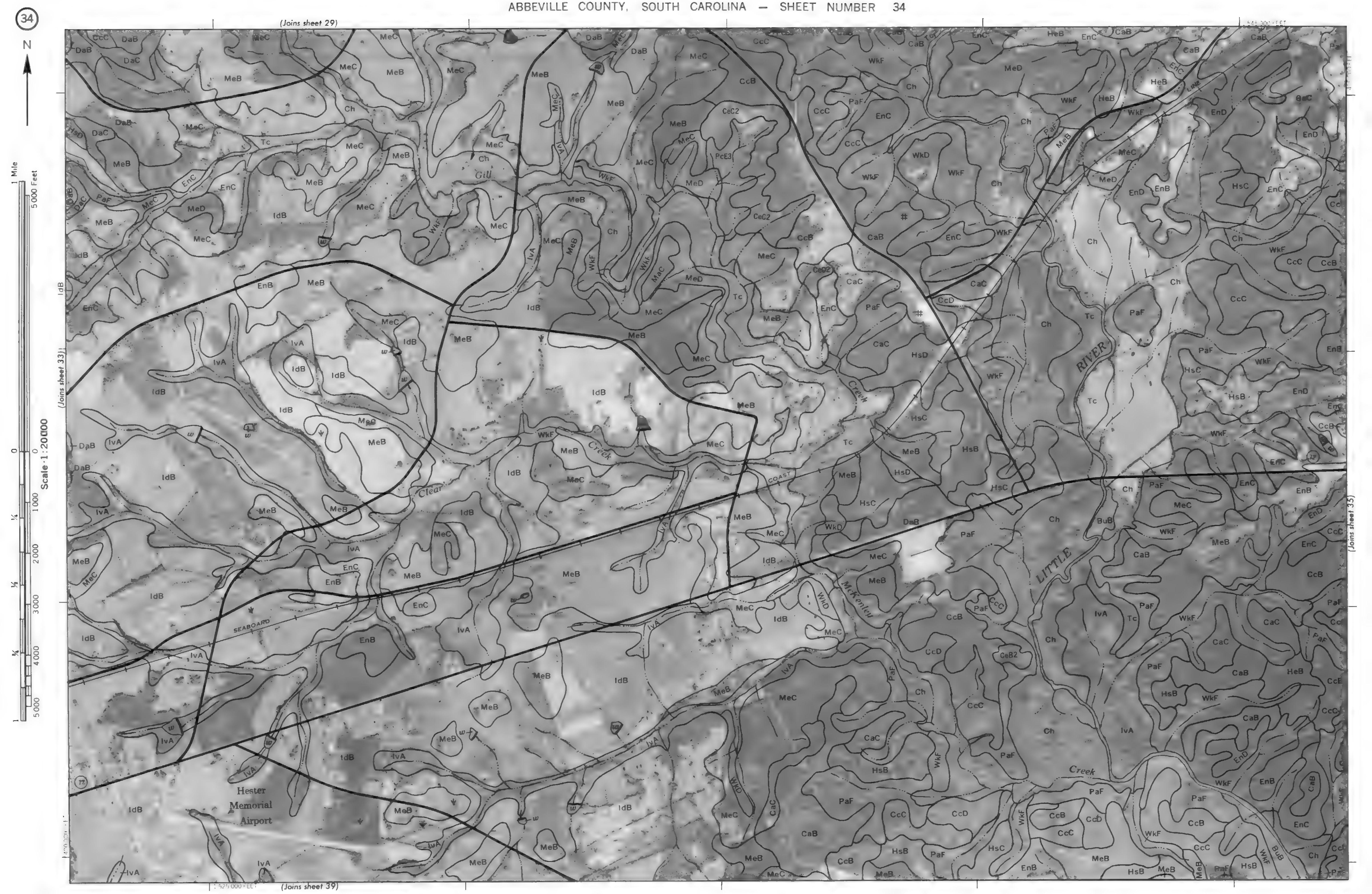

N
(Joins sheet 24)
(Joins sheet 29)
(Joins sheet 31)
(Joins sheet 35)
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1
Little River
Reed Creek
Creek
Inf Creek
Flagreen
Calhoun
Creek
Watts
SEABOARD
COAST
LINE

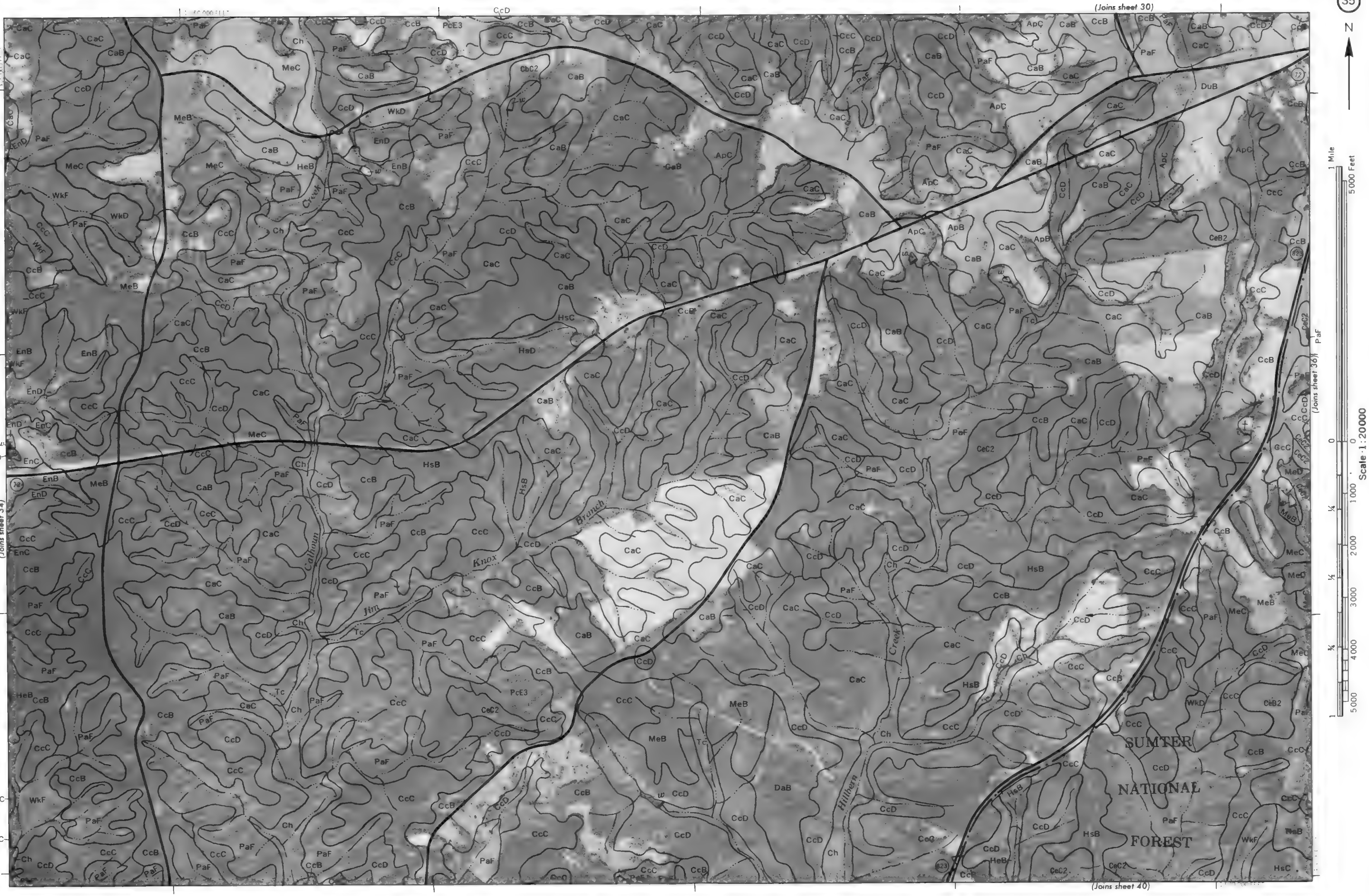
ABBEVILLE COUNTY, SOUTH CAROLINA — SHEET NUMBER 31



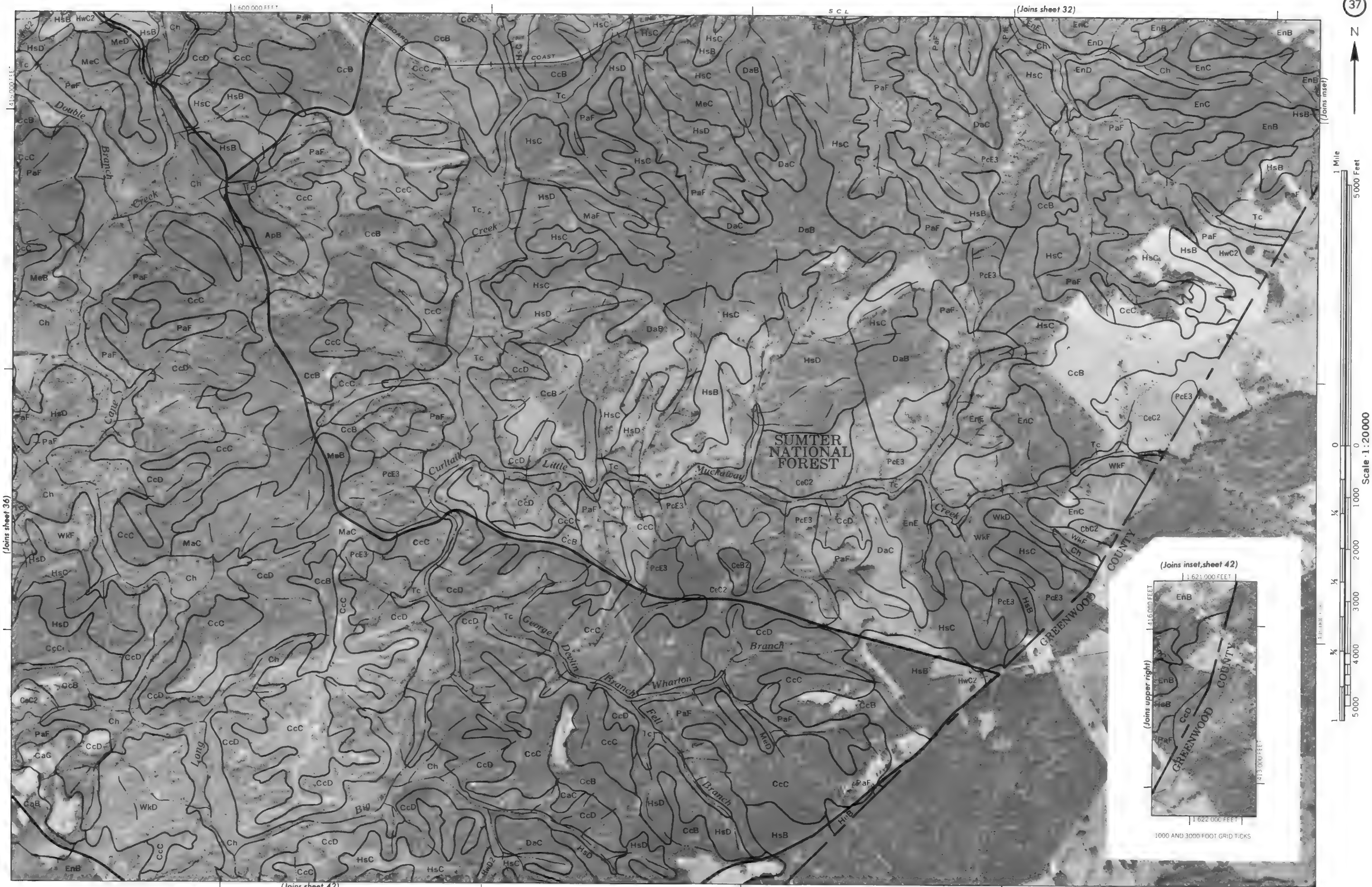

N
(Joins sheet 26)
(Joins sheet 31)
(Joins inset, sheet 42)
(Joins sheet 37)
Scale 1:20000
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
SUMTER
NATIONAL
FOREST
McCord Creek
Cane Creek
Long Creek
Curltail Creek
Little Curltail Creek
Big Creek
Grays Creek
SEABOARD COAST LINE

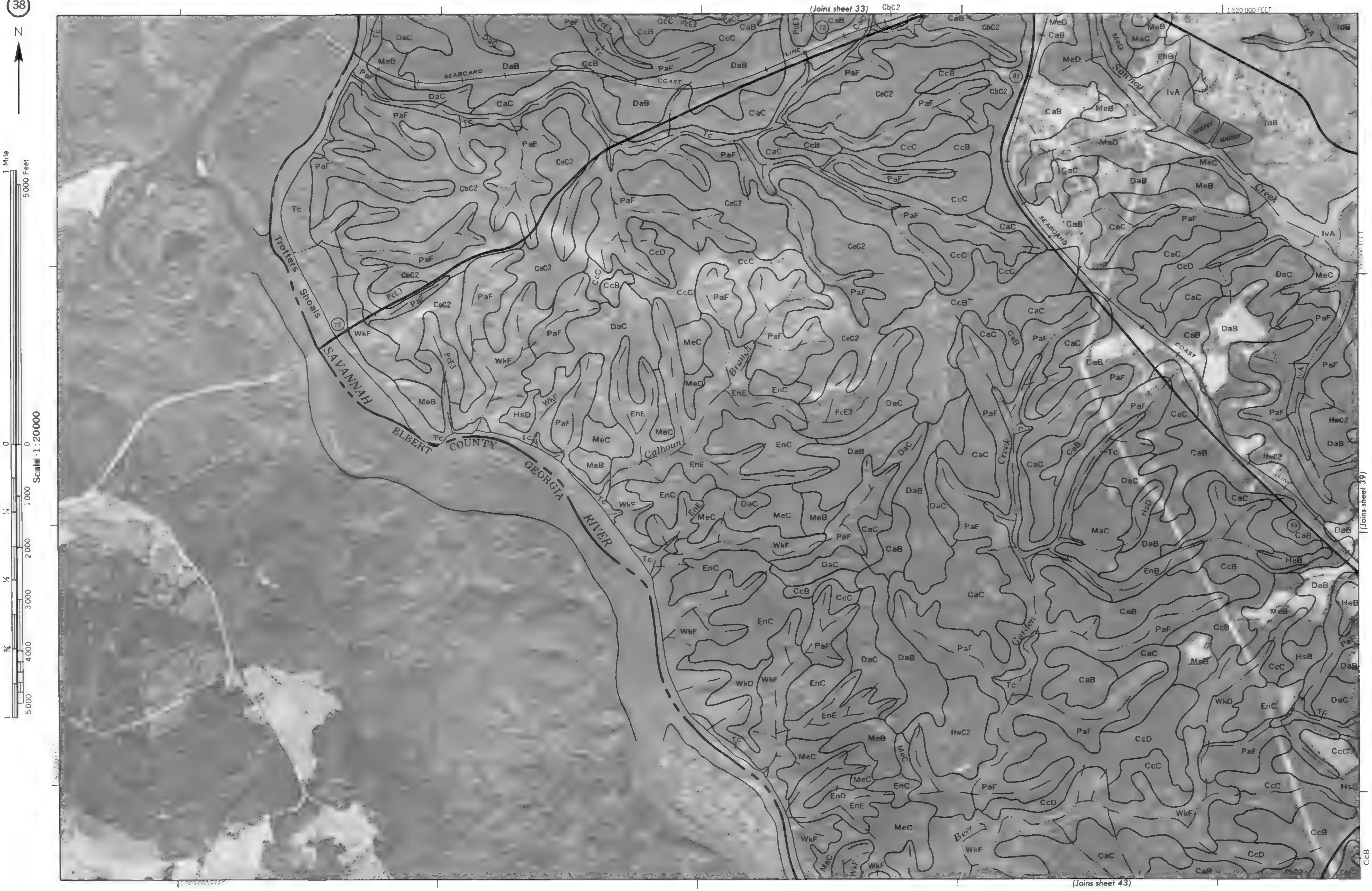

33
N
(Joins sheet 28)
(Joins sheet 34)
(Joins sheet 38)
(Joins inset, sheet 43)
1 500 000 FEET
415 000 FEET
SAVANNAH RIVER
ELBERT COUNTY
GEORGIA
ROCKY RIVER
SEABOARD COAST LINE
CALHOUN FALLS
1 Mile
5000 Feet
Scale 1:20000

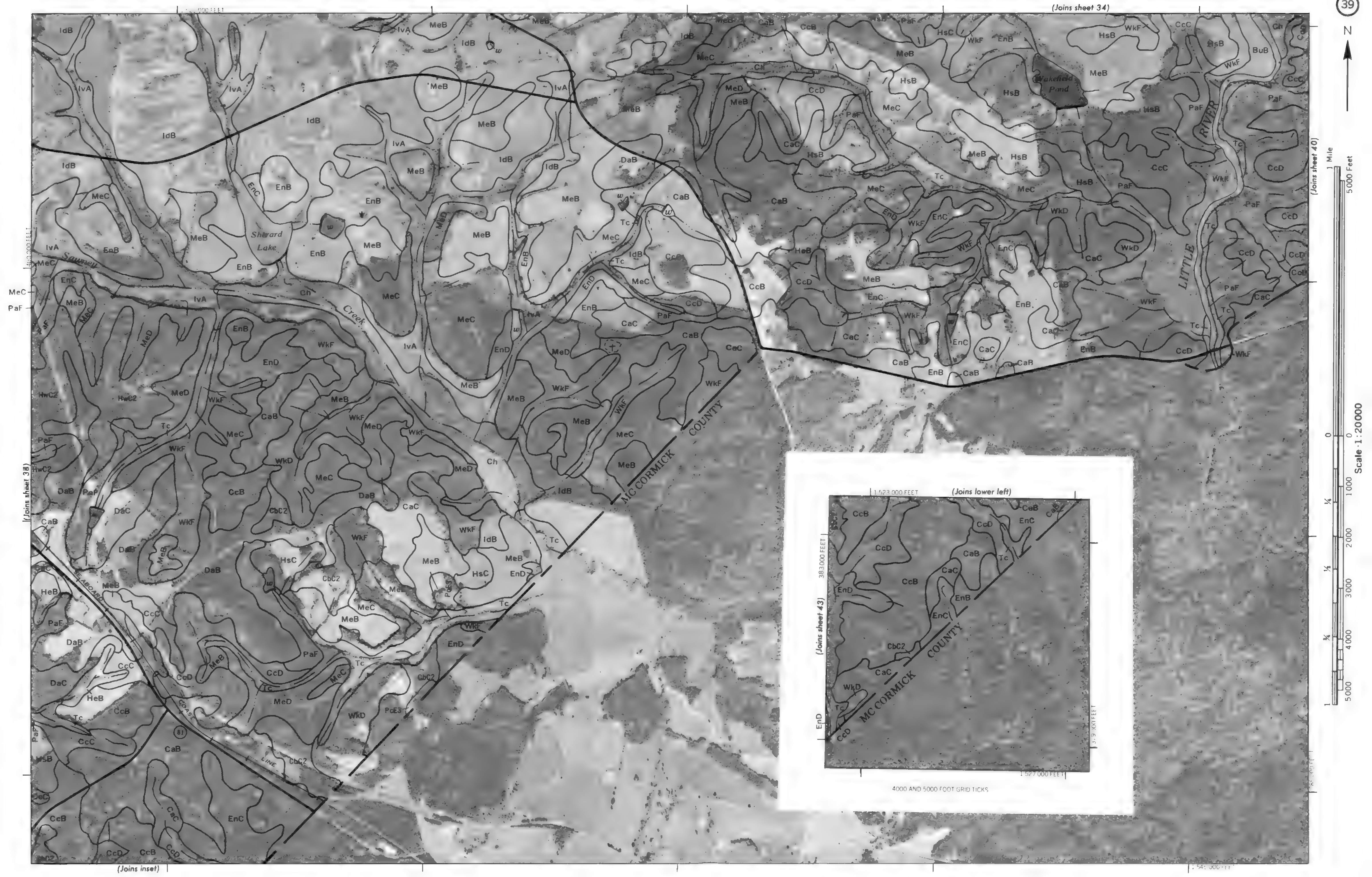

34
N
(Joins sheet 29)
(Joins sheet 33)
(Joins sheet 35)
(Joins sheet 39)
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
Gill
Clear
Creek
McKenley
LITTLE
RIVER
SEABOARD
COAST
LINE
Hester
Memorial
Airport


35
N
(Joins sheet 30)
(Joins sheet 34)
(Joins sheet 36)
(Joins sheet 40)
SUMTER
NATIONAL
FOREST
Calhoun
Creek
Knox
Branch
Jim
Hillburn
Creek
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1


(Joins sheet 31)
(Joins sheet 35)
(Joins sheet 37)
(Joins sheet 41)
N
Scale 1:20000
1 Mile
5000 Feet
SUMTER
NATIONAL
FOREST
Hammond Branch
Mountain
Parsons Mountain Lake
Creek
McGill Branch
Double Branch


37
N
(Joins sheet 32)
(Joins sheet 36)
(Joins sheet 42)
(Joins inset)
1 600 000 FEET
SEABOARD
COAST
LINE
S C L
Double Branch
Creek
Cape Creek
Creek
Curltail Creek
Little Muckaway Creek
SUMTER NATIONAL FOREST
George Devlin Branch
Wharton Branch
Fell Branch
Long Branch
Big
GREENWOOD COUNTY
(Joins inset, sheet 42)
1 621 000 FEET
1 622 000 FEET
415 000 FEET
413 000 FEET
(Joins upper right)
GREENWOOD
COUNTY
1000 AND 3000 FOOT GRID TICKS
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000

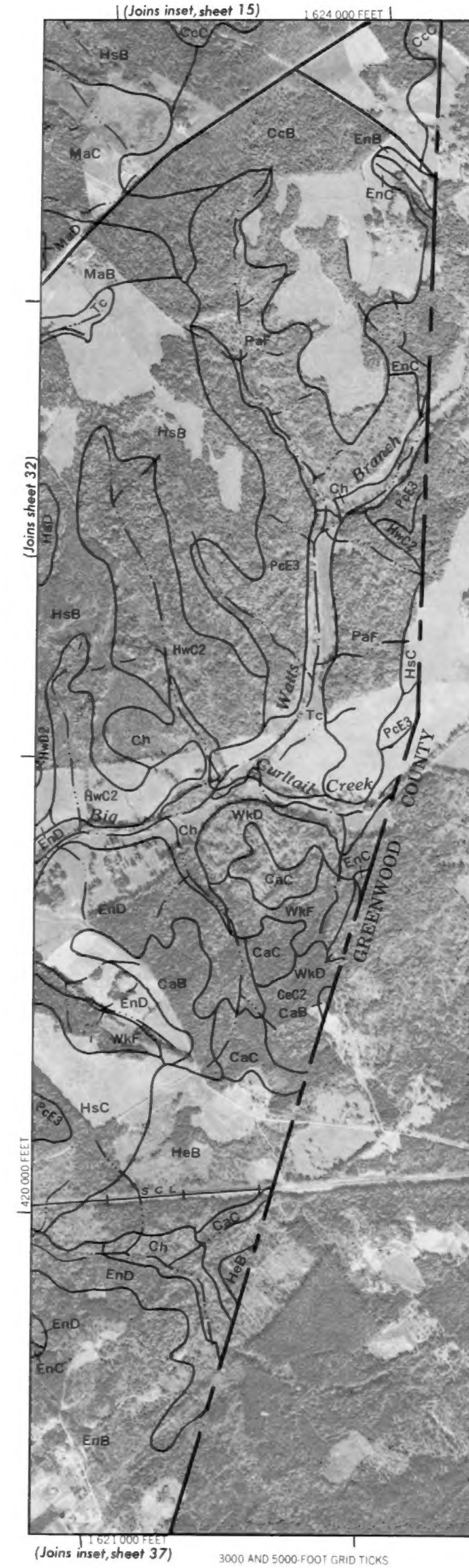

38
N
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
(Joins sheet 33)
(Joins sheet 39)
(Joins sheet 43)
1 520 000 FEET
SAVANNAH
RIVER
ELBERT COUNTY
GEORGIA
Trotters Shoals
Calhoun
Branch
Creek
Garden
Beer
Sauney
Creek
SEABOARD
COAST
LINE
water
water
72
81

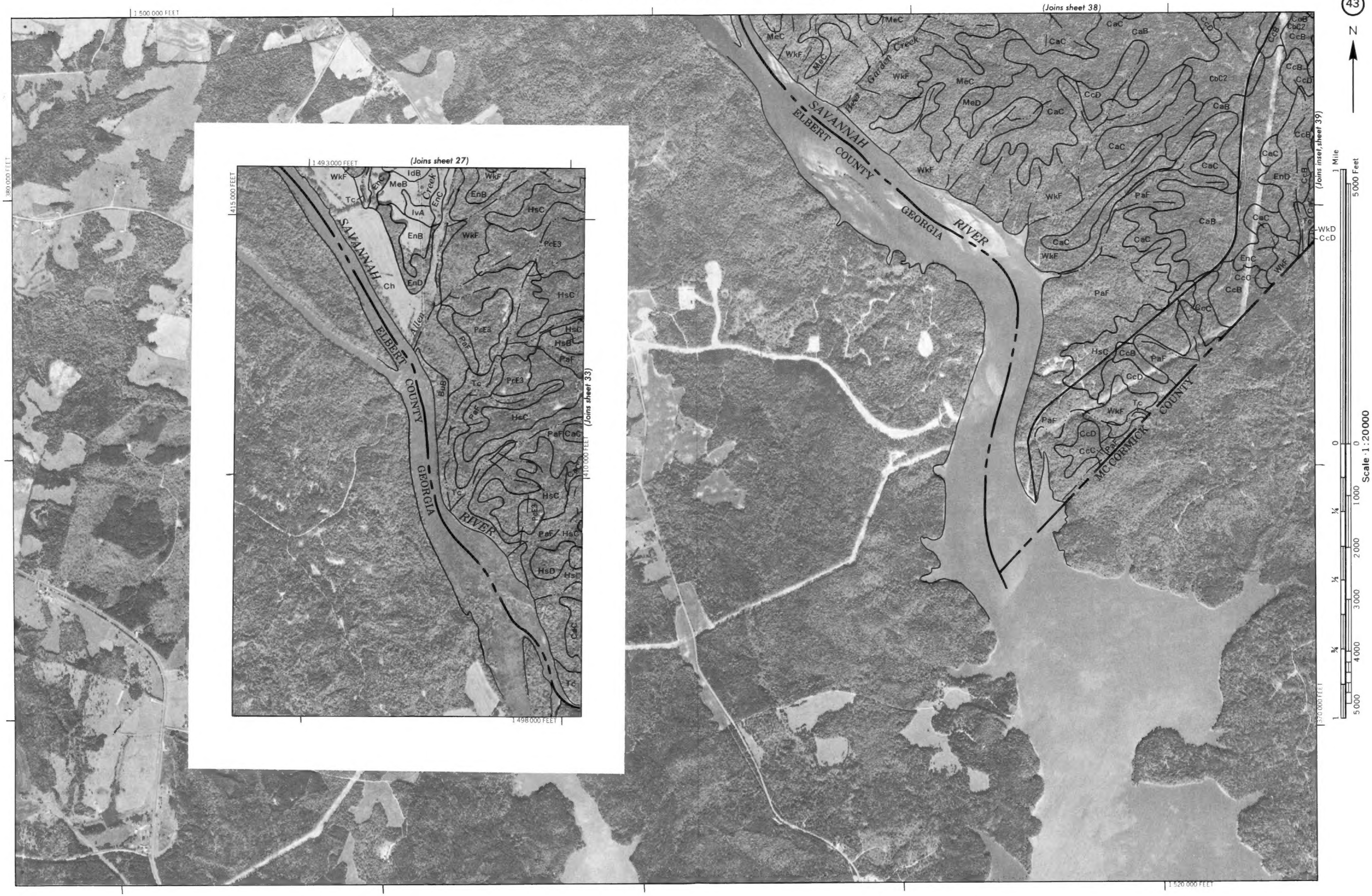

39
N
(Joins sheet 34)
(Joins sheet 40)
(Joins sheet 38)
(Joins inset)
(Joins lower left)
(Joins sheet 43)
Wakefield Pond
Sharard Lake
Creek
LITTLE RIVER
MC CORMICK COUNTY
4000 AND 5000 FOOT GRID TICKS
Scale 1:20000
1 Mile
5000 Feet


40
N
(Joins sheet 35)
(Joins sheet 39)
(Joins sheet 41)
1 570 000 FEET
400 000 FEET
385 000 FEET
1 550 000 FEET
1 Mile
5000 Feet
Scale 1:20000
SUMTER
NATIONAL
FOREST
MC CORMICK COUNTY
Calhoun Creek
Creek
White Creek
823


(Joins sheet 36)
(Joins sheet 40)
(Joins sheet 42)
41
N
SUMTER
NATIONAL
FOREST
PARSONS
MOUNTAIN
MC CORMICK
COUNTY
White Creek
Mountain Creek
Candy Branch
Richie Branch
1 575 000 FEET
1 595 000 FEET
400 000 FEET
385 000 FEET
1 Mile
5000 Feet
Scale 1:20000


N
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
(Joins sheet 37)
(Joins sheet 41)
1 610 000 FEET
400 000 FEET
385 000 FEET
1 600 000 FEET
SUMTER
NATIONAL
FOREST
GREENWOOD COUNTY
MC CORMICK COUNTY
Mountain Creek
Church Branch
Still house Branch
Cane Creek
Long Cane Creek
Branch
Creek
EnB
EnC
EnD
CcB
CcC
CcD
Ch
Tc
WkF
WkD
DaB
DaC
MeB
MeC
MeD
PaF
HeB
HsC
HsD
HsB
HwC2
HwD2
CaB
CaC


(Joins inset, sheet 15)
(Joins sheet 32)
(Joins inset, sheet 37)
1 624 000 FEET
430 000 FEET
420 000 FEET
1 621 000 FEET
3000 AND 5000-FOOT GRID TICKS
GREENWOOD COUNTY
Watts Branch
Curltail Creek
Big
HsB
MaC
MaB
CcB
EnB
EnC
EnD
PaF
PcE3
HwC2
Ch
Tc
HsC
WkD
WkF
CaC
CaB
HeB



43
N
(Joins sheet 38)
(Joins inset, sheet 39)
(Joins sheet 27)
(Joins sheet 33)
1 500 000 FEET
380 000 FEET
1 493 000 FEET
415 000 FEET
410 000 FEET
1 498 000 FEET
370 000 FEET
1 520 000 FEET
SAVANNAH
ELBERT COUNTY
GEORGIA
RIVER
MC CORMICK COUNTY
Allen Creek
Beaver Garden Creek
Scale 1:20000
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
MeC
WkF
MeD
CaC
CaB
CcD
CbC2
CcB
CcC
EnD
EnC
EnB
WkD
PaF
HsC
HsB
HsD
Tc
IdB
MeB
IvA
Ch
PcE3
BuB